CONTENTS

Established 1914

CHEMICAL INDUSTRIES

Vol. 40 Feb. 1937 No. 2

Published monthly and entered as 2d class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, domestic and Canada, $3 a year; foreign, $4.

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The Reader Writes:—

Outside Topics Too Biased

Editorials usually good pertaining to the chemical industry but your treatment of outside topics is too biased.

Newark, N. J. L. MANDEL
Slick-Shine Co., Inc.

We Have Not Labored In Vain

We have not only enjoyed but have gained much from CHEMICAL INDUSTRIES.

New York City GEORGE G. PEASE
Knickerbocker Exterminating Co., Inc.

Not Exactly New

On page 597 of your December 1936 issue, you have an item quoting me as saying that we have developed a product known as Maizolith from phenol and furfural, which is a plastic similar to the phenol formaldehyde plastic. I do not know where you got your information, but I am quite sure that I never made any such statement as that. We have made plastics from furfural and phenol here in our laboratories. Furfural can be substituted very satisfactorily for formaldehyde in these plastics and is, I believe, being used to a considerable extent commercially. However, this is you might say "old stuff", and while we frequently in discussing furfural mention the fact that it can be so used, we have not been putting out this information as anything new or recent in the way of developments.

We have been doing some work on the production of a plastic by the treatment of corncobs with acid and cresol or phenol. One of the things that happens in this process is that the acid liberates furfural from the cobs and this reacts with the cresol or phenol to form the plastic. However, we have not said much about this material because it is in an experimental stage and we prefer to say more about it when it is ready for commercialization.

The term Maizolith applies to an entirely different material than any sort of plastic. Maizolith is a name which we have given to a cellulosic product with which we are experimenting. It is produced by digesting cornstalks or corncobs with caustic soda to produce a pulp similar to paper pulp. This pulp is then refined in a Jordan refiner until we get it down to colloidal dimensions. When it is dried it produces a very hard dense material which while similar in appearance to the phenol formaldehyde plastic, is an entirely different material and is not volatible at all.

We are glad to have news items in regard to our work, but this one puts us in the light of claiming something which we thought everyone else knew for a long time and rather makes it look as though we are making a lot of "ballyhoo" over nothing.

Ames, Iowa L. K. ARNOLD
Iowa State College Agriculture and Mechanic Arts

The Patman Act and the Distributor

The Patman Bill seems to be the modern miracle worker to the producer as indicated by the glib way it is cited to meet every hard business problem. One of the first uses many manufacturers see in this Act is the golden opportunity to tie a noose around that troublesome problem child, known as a chemical distributor.

To some manufacturers the chemical distributor is a jobber. The distributor regards himself as anything but this. He is the manufacturer's agent; a part of the manufacturer's selling organization, who has been forced many times into a jobber classification by the manufacturer's own policies and methods of handling him.

Is distributor and jobber a synonymous term?

If a distributor is a jobber, then he owes no special allegiance to any one source of supply; he is free of any particular domination or control as to the conduct of his business by any particular manufacturer. He owes no responsibility for tonnage or sales accent to anyone but himself and is without obligation to keep his source posted as to his sales outlets or sales methods.

A true distributor works with his principal, providing a market outlet for a producer who has no sales set-up in the area occupied by the distributor. He is subject to his principal's sales programs and policies and is not free to obtain merchandise except through his one principal channel. He is the producer's salesman who gets paid a salary by commissions rather than by a fixed amount. He is competing against other producers, whose salesmen may have their own distribution set-up, and should be on a competitive basis to compete with them.

The producer in his selling price has a sales cost included; the distributor should receive a part of this sales cost and not have it added to the base price, or omitted.

The old argument the distributor gets his profits on the differential between the quantity price and the L. C. L. price is no argument. (Any jobber has this margin.)

The distributor is entitled to a special treatment for (1) When he sacrifices his freedom of action; (2) When he provides a manufacturer's brand definite outlets in a trade area; (3) When he provides special sales accent and is held responsible for a definite tonnage and special cooperation with the producer.

If the manufacturer does not want to give a distributor anything but a jobber set-up, he should not complain when the distributor shows no special signs of loyalty. If the manufacturer wants jobber outlets only, then he must expand his own sales set-up to provide the services and the marketing methods a distributor now offers for him, or he will soon find he has lost a sales market.

You get what you pay for. If you want a distributor and need him, hire him and pay him his salary. Don't try to hide behind the Robinson-Patman Act as it was not intended to affect and does not now affect the true chemical distributor. You can make any deal with your distributor you desire just as you can hire any salesmen you need, and it is neither your competitor's business nor is the Government going to penalize you for having a selling organization.

There are many ways to work these matters out if the producer wants to effect a plan. The trouble today is he wants an excuse, not a plan.

Practical and economic considerations seem to demand the continuation of a true distributor for certain types of manufacturers. Is the chemical distributor and his usefulness as such through, or will he merely be recreated under some new designation?

Kansas City, Mo. CHARLES THOMPSON

Appreciates the Business Side of Chemistry

Until my "discovery" of CHEMICAL INDUSTRIES I knew little of what was going on in the industrial world of chemistry. Now I enjoy a pretty good idea of how my profession is being practiced outside of the academic institutions in the various parts of the U. S. Therefore, I offer you compliments on the excellence of your magazine. I have no suggestions to make; none are needed.

Midas, Nevada KERBY STODDARD

CHEMICAL
INDUSTRIES

The Chemical Business Magazine

The U. S. Patent System

It is fashionable to consider anything over twenty years old superannuated. Herein lies one marked difference between British and American psychology. The Briton learns from experience. He respects past achievement, while visioning improvement. Changes necessitated by changing conditions he prefers to make step by step, after consideration of the harm, as well as good, that may follow each step. He observes results, before beclouding them with other changes. We are prone to many hasty changes that obscure the effect of any one. Thus we forfeit both the benefit of success and the lesson of failure.

It is recognized, here and abroad, that our patent system has greatly fostered the growth and variety of our industries. The faults we criticize with any justice may be faults of its administration, our own hasty carelessness, or our attempts to misuse it—not of the system itself.

All critics agree upon one outstanding trouble of our patent system. We might well concentrate attention and effort on correcting that and then observe results, rather than scattering attention over a multitude of theoretically possible "reforms". This trouble lies in the shifting personnel and the consequent lack of experience, intelligent judgment, and constructive policy in the Patent Office itself. The fault is ours. We pay all examiners far too little for the importance of the work; too little to make work in the Patent Office a really worth-while career.

The Patent Office receipts are not insufficient. For years a sizable balance has been dumped into general funds. The money paid in obtaining patents, etc., should be plowed into the service, additional services for pay could well be provided, and the increased revenue distributed as increased reward for better service by men of long experience and a deep sense of responsibility in their careers.

Williams Haynes, Publisher, A. M. Corbet, Publication Manager; W. J. Murphy, Editorial Manager; W. F. George, Advertising Manager, D. O. Haynes, Subscription Manager; J. H. Burt, Purchaser.

Antedating the Farm Chemurgic

Isolated agricultural communities rarely exhibit a standard of living in keeping with those more fortunate regions contiguous to industrial developments. It cannot be that agriculture itself is to blame, for we find the same crops, the same animal husbandry in both localities. Wheat is alike in Eastern Europe and Eastern Pennsylvania. A hog in Poland is just as recognizable as in Iowa. Yet we do not find the typical home of the Eastern European farmer at all resembling that of the Pennsylvanian. The electric light, the running water, the school bus, the auto, the farm machinery are all missing to the East. Age is not responsible, for we can only count years; there they reckon in centuries. Racial distinctions cannot be the answer, for some of our best farms house emigrants from those very countries, or at least only a generation or two removed. It is not only the ocean that separates us, for in those countries of Europe highly industrialized one finds standards on the farms more nearly comparable to our own.

The real answer is found in that close relationship of agriculture to industry. Each supports the other and in a manner helps raise the standards of both. If one prospers, so does the other: if one falls, both go down together. It requires no great logical prowess to understand the fundamental reasons for this close relationship. Yet today, in this country, we are witnessing a persecution of industry because it is industry, and a sustenance of agriculture because it is agriculture.

More or Less Pork in Whose Barrel?

Anyone who has fifteen cents can buy from the Superintendent of Documents, Washington, D. C., a 47 page pamphlet, "Administrative Management in the Government of the United States." It was prepared by "The President's Committee on Administrative Management" and it is dated January 8, 1937. It had its brief day in the press competing with murders, Spain, and strikes. A few Congressmen and Senators in response to inquiries from the pressmen mumbled that they had read it or had not read it; that it deserved attention or that they were disappointed. The news had spread that it contained proposals which if put into law would take some of the pork out of the barrel. What a blow! The election past, overwhelming majorities, plenty of public funds, and along comes a new plan devised by three college professors that threatens to take patronage from Congress and turn it over to the President.

There is nothing in the report to indicate that any real consolidation and decent, businesslike organization would reduce the dreadful burden of the taxpayer. The best hope is that perhaps, if some of the endless boards and bureaus could be squeezed together so that the personnel would be unable to get into a given space, then elimination would be a necessity. It is patent that "few die and none resign."

Quite Different Fuel Problems

With gasoline selling at less than 5c at Mid Continent refineries (before taxes, transportation and retailing costs) synthetic gasoline may have seemed dimly remote. Nevertheless synthetic motor fuel is already here on a large scale and in Germany current developments indicate a production nearly sufficient for the national need. Most of the new manufacturing capacity is by the hydrogenation of carbon monoxide or water gas by the Fischer process and to a lesser extent by the Bergius process of coal hydrogenation.

The cost of either Fischer or Bergius motor fuel from coal is much higher than either straight run or cracked gasoline from petroleum.

Our own supply of gasoline distilled straight from crude petroleum began to be inadequate in 1912, when the cracking process came into large scale operation. With higher engine compression motor fuel is used more efficiently but we must be more "choosy" as to that motor fuel. Much of our gasoline from light paraffinic crudes has to be "re-formed" by cracking before it is usable in modern cars. We are rapidly developing a considerable production by so-called polymerization or coupling up certain gaseous hydrocarbons to gasoline. This synthetic gasoline has high anti-knock value and is far superior in this respect to synthetic motor fuel made from coal. It is, however, only an auxiliary supply to our enormous demand.

For aviation fuels the requirements as to anti-knock and power values are still more severe. The most promising materials, where 100 octane rating is desired, are iso-octane made by coupling up isobutene, and blends containing up to 40 per cent. of isopropyl ether. Both of these, and perhaps the polymer motor fuels, may be regarded as synthetic motor fuels.

In this country our problem is to modify much of our natural motor fuel and to supplement it by synthetic hydrocarbons to meet the increasingly exacting requirements of high anti-knock engines, particularly aviation motors. In Europe the problem is to provide motor fuel of any kind under the restrictions that would be imposed by war.

Chemicals in Petroleum Refining

Part I

By L. F. Marek

Arthur D. Little, Inc.

THE petroleum industry looms large as a consumer and user of chemicals. Because of this large utilization of chemicals and because of the increasing tendency to use petroleum hydrocarbons as intermediates in chemical synthesis, the petroleum industry may be classed as a "chemical industry" despite the fact that many of its important operations are strictly physical. Both as user and as consumer of chemicals it requires quantities of a few materials and relatively smaller quantities of a great variety of others. The trend is increasingly toward the utilization of a greater variety of materials as the demands upon the products become increasingly stringent and as the technology of their use is evolved.

In the early days of the industry, with gasoline, kerosene (lamp oil), and lubricating oils about the only products, the principal object of refining was the removal of objectionable odor and color. Chemical treatment consisted in, first, agitation of the potential product with sulfuric acid to remove sulfur compounds giving rise to bad odors and highly colored compounds present in the oil and then, after separation of the sludge which formed, neutralization with caustic soda. In the case of gasoline, additional use was made of lead oxide which mixed with caustic alkali formed the "doctor" solution used to "sweeten" the product. The value of these treatments in yielding gasoline of good color and odor, kerosene with improved burning qualities, and lubricating oils with properties nearer to those made from Pennsylvania crudes is evidenced by the persistence of the practice and the constantly increasing consumption of these chemicals with increasing volume of production.

Refinery Production Compared with Sulfuric Acid and Caustic Soda Consumption

Year	Sulfuric† acid 50° Be. short tons	Caustic† soda short tons	Production* of finished gasoline at refineries in bbls. of 42 gallons	Production* of kerosene in bbls. of 42 gallons	Production* of lubricants bbls. of 42 gallons
1919	522,000	....	94,235,000	55,753,000	20,161,000
1929	1,570,000	134,000	435,078,000	55,940,000	34,359,000
1930	1,420,000	117,000	432,241,000	49,208,000	34,201,000
1931	1,348,000	103,000	431,510,000	42,446,000	26,704,000
1932	1,240,000	93,000	392,623,000	43,836,000	22,433,000
1933	1,140,000	87,000	401,591,000	48,977,000	23,775,000
1934	1,100,000	84,000	416,932,000	53,855,000	26,373,000
1935	980,000	90,000	457,692,000	55,813,000	27,771,000

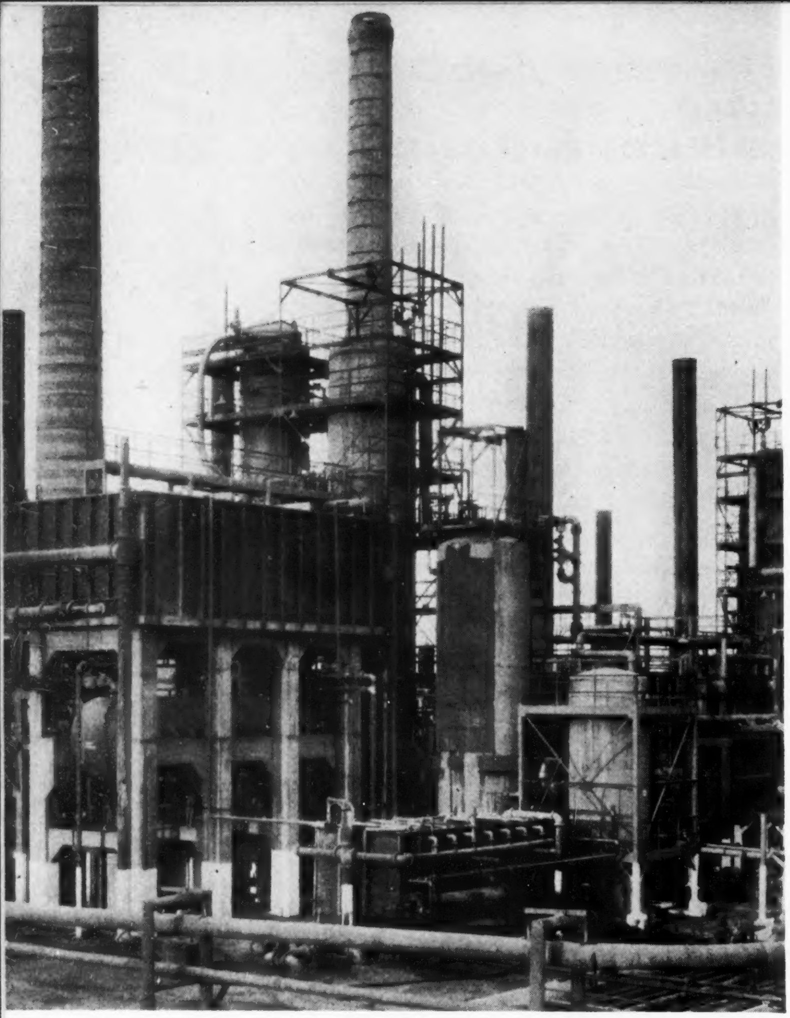
* American Petroleum Institute, Statistical Bulletin **17** (26), May 22, 1936.
† Chemical & Metallurgical Engineering, Annual Surveys.

This trend apparently climaxed in 1929 to judge by the available statistics on the industry because since that time not only has the total consumption of these two materials steadily decreased but, what is more significant, the consumption per barrel of product has also decreased.

This extraordinary consumption of sulfuric acid has made it the most important chemical used by the petro leum industry and has made the petroleum industry the second most important user, exceeded only by the fertilizer industry. This popularity has been based on its low cost, readily controlled activity, and almost universal applicability to the three major refined products of the industry.

As an auxiliary refining agent to sulfuric acid caustic soda has been so widely used that the petroleum industry ranks next to the two largest individual consumers, rayon and soap. However, lacking the specificity of sulfuric acid, caustic soda may be replaced by other alkalies. Thus, soda ash is sometimes used with the more volatile petroleum products on a cost basis. Lime which is even cheaper has been used to treat natural, straight run, and even cracked gasoline but has the disadvantages of being slower acting than caustic soda, being harder to separate, and having a tendency to form emulsions. This emulsifying tendency increases with the boiling range of the product since the lime salts of naphthenic acids become increasingly soluble in the oil and act as emulsifying agents. On the basis of combining weights, ammonia also is cheaper than caustic soda and may find increasing use.

The treatment of gasoline and kerosene for elimination of objectionable odors arising from hydrogen sulfide and mercaptans still follows in large measure the sodium plumbite or "doctor" solution procedure by which the hydrocarbon is agitated with sulfur and an aqueous solution of caustic soda containing sodium plumbite. Although it was formerly the custom to discard the spent "doctor" solution, recovery methods are now used to regenerate the lead oxide which is used repeatedly, small additions of chemicals being made to maintain the proper concentrations in the solution. Keith and Forrest show that, indicative of this trend, the litharge consumption has dropped steadily from 13,615 tons in 1919 to 4,793 tons in 1932.[1] Some idea of the recovery possibilities of the spent reagents is gained from the reported recovery by one refiner of 17,000 lbs. of litharge, 55,000 lbs. of 11-13% caustic



Two of the new polymerization units at the plant of Phillips Petroleum, Borger, Texas, having a daily capacity of 2,000 barrels of Thermal Process Polymer gasoline.

soda solution and 450 bbls. of oil daily from spent "doctor" solution.[2] In doctor sweetening lead sulfide plays a part as an intermediate and some grades may be used with alkaline solutions and sulfur for this treatment.

Now, the trend in refining is toward the use of more specialized methods involving the increasing use and consumption of a variety of reagents. The reasons for this are readily apparent. As the practice of cracking developed to produce higher yields of motor fuels of higher anti-knock value, the gasoline to be refined became increasingly unsaturated in character and treatment by the standard sulfuric acid method resulted in increasingly larger losses of yield and value through polymerization to sludges of the unsaturated components. Improvements in the acid treating methods aimed at a controlled, limited action of the acid have been made but acid treatment of cracked gasoline still results in losses of yield and of anti-knock value. Consequently, subsequent to about 1926, other methods have been developed to remove the objectionable highly unsaturated portions of the cracked product giving rise to gum formation and color deterioration and to eliminate the sulfur compounds causing bad odors and low tetraethyl lead response. In accounting for the decreasing consumption of sulfuric acid, some of the newer methods of refining will have to be considered.

In one phase of this development the industry has taken to the use of special clays for vapor phase treatment of the cracked product in order to eliminate gum-forming compounds, like the diolefins, through a process of polymerization. Such a process in wide use at present is that developed by Gray. Naturally, the adaptation of clay treatment resulted in a corresponding decrease in the use of the chemicals formerly used. Color improvement, so much sought after in the early days, is at present of less significance since most gasolines are colored with dyes as trade-marks, to cover the natural color of the product, and to conform with Government regulations that gasoline containing tetraethyl lead must be colored. Treatment may, therefore, be decidedly selective for the removal of the worst offending portions of the product only and the remainder left in the gasoline to be taken care of by dyes and inhibitors, which stabilize color and prevent deposition of gum. However, sulfur compounds are not affected by this treatment and sweetening must still be resorted to.

Competing with the clay processes are a number of chemical processes. Exemplary of these is the Lachman zinc chloride process by which the gasoline is treated with an aqueous solution of zinc chloride, which acting as a catalyst only is consumed in very small quantities.

Recently the so-called "copper sweetening" process[3] has received attention, more than 20 copper treating installations having been made up to late 1936. This process depends upon the oxidizing power of cupric chloride in hydrochloric acid solution for oxidizing the mercaptans of sour gasoline to disulfides. The reagent is not consumed but is regenerated by blowing with air to reoxidize the cuprous chloride so that oxygen from the air is the real reactant, the copper solution being the means for making it effective. Where free sulfur or hydrogen sulfide is present, a pretreatment with an alkaline polysulfide solution is required. The treating solution of this process is very corrosive but it has been found that tanks, pipes, and valves of Haveg and pumps, valves, etc., of Durichlor are quite satisfactory.

For the treatment of straight run or natural gasoline containing no olefinic hydrocarbons solutions of sodium or calcium hypochlorite are used in several American refineries. It is estimated that 80 per cent. of the natural gasoline sweetened in oil fields is treated by the hypochlorite method. The calcium salt is cheaper than the sodium and being also more satisfactory for use in small plants is the more widely used of the two. The method is unsatisfactory for use with cracked gasoline containing olefins since chlorine tends to enter the hydrocarbon molecule and cause trouble later when the gasoline is used.

Hypochlorite treatment is comparatively simple, the treating solution being effective to the extent of its available oxidizing power and becoming simply a dilute

solution of sodium or calcium chloride and alkali after this is exhausted. Emulsions do not occur and there is no sludge to revivify or dispose of. Cost figures depend upon the amount of chlorine required and have been estimated to be about one to one and one-half cents per barrel treated with sodium hypochlorite and about three-quarters cent per barrel treated with calcium hypochlorite, with reference to Mid Continent stocks.[4]

Ideal Reagent Yet Undiscovered

A great variety of other sweetening reagents have been suggested in the patent and technical literature but the ideal treatment has not yet been found, all reagents now in commercial use having some deleterious or undesired effects. The ideal method would be economically feasible and give a gasoline of good color stability, no reduction in octane number, no loss of natural inhibitors and no adverse effect on tetraethyl lead susceptibility.

As with gasoline, so with lubricating oil manufacture, the industry has been forced by more stringent demands for certain qualities and by internal competition to adopt radically new methods of refining. In the case of lubricating oils the quality criteria are viscosity index, pour point, and resistance to oxidation and sludging. The old sulfuric acid treatment followed by neutralization and clay percolation does not effect the desired quality attainment from the majority of crudes now used, and furthermore results in the formation of acid sludge which cannot be marketed as such.

It has been found possible by the use of certain selective solvents to separate the lubricating oil raw stock into two portions, without deterioration, so that the one consists of the desired lubricating oil and the other of a salable fuel oil. These solvent-refining processes, while consuming small amounts of chemicals make use of relatively large volumes of chemicals new to the industry. Data are not available on the consumption of chemicals by this new refining technique. With some of the chemicals, as phenol, benzene, toluene, propane, sulfur dioxide, furfural, and nitrobenzene, the consumption for lubricant refining would make but small impression on the normal total consumption but with certain of the other chemicals, such as acetone, the chlorinated solvents, crotonaldehyde, and cresol a large proportion of the supply may be required.

The use of solvents has been applied to dewaxing, deasphaltizing, or both in lubricant manufacture. Naphtha has long been used as a diluent in dewaxing and no account of its use and application is taken here. Of the chemical solvents which are now being used liquid sulfur dioxide has long been used in the refining of lamp oils and has been effectively applied to the lamp oil cuts from the Pacific and Gulf Coast crudes. This solvent is effective in permitting a separation from a petroleum cut of that portion comprising the aromatic and olefinic hydrocarbons. It is also being applied not only to lubricating oils but to gasolines for the manufacture of special solvent fractions. Solvent extraction with furfural, developed for lubricant improvement, is likewise being tried in the refining of motor fuels.

Thus, in the early part of 1935 there were 21 solvent refining and dewaxing plants in the United States with six major plants under construction. In addition to the capacities given in the table there are now plants employing the benzene-methyl ethyl ketone and the Multi-Sol (furfural) process at Port Arthur, Texas. The crotonaldehyde process has not received marked attention. By late 1936 there were also in operation five solvent dewaxing plants with finished capacity of 7000

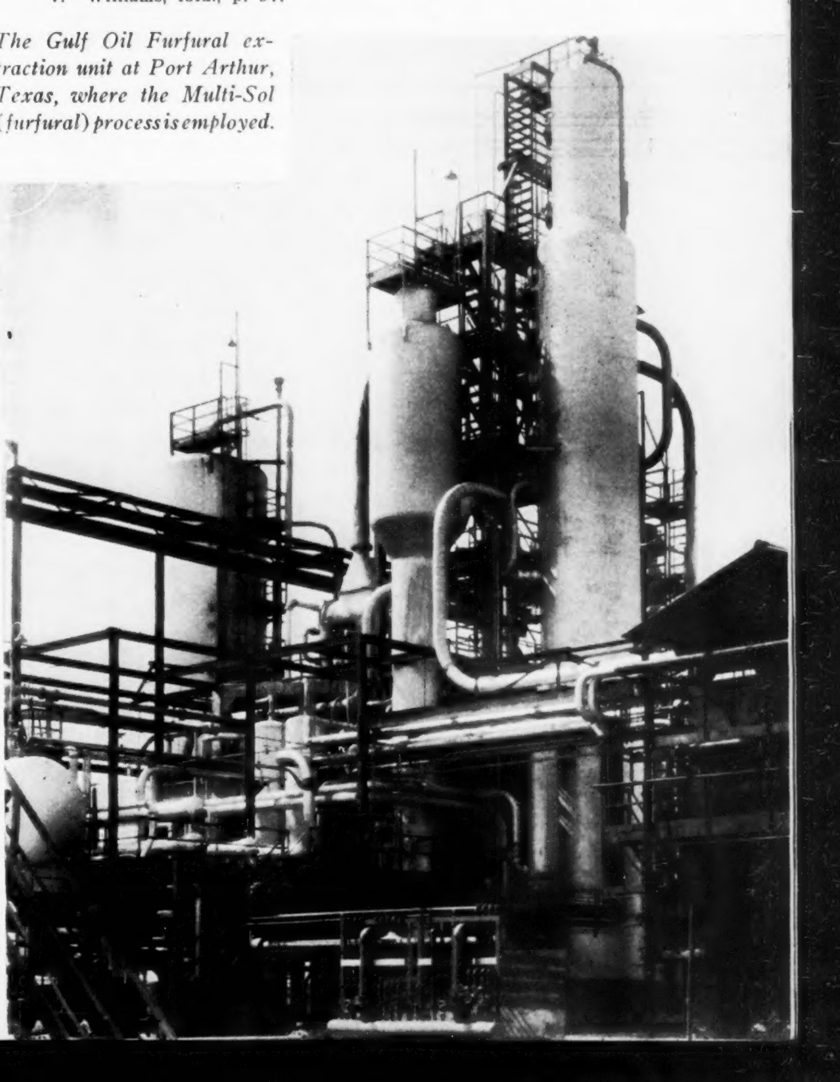
Solvent Treatment of Lubricants *

Summary of U. S. Plants, January, 1935

Solvent Refining Solvent	Charge capacity bbls. per day
SO_2 and SO_2 plus Benzene	12,992
Phenol	13,280
Duo-Sol (Propane plus Cresol)	7,530
Chlorex	4,815
Nitrobenzene	2,350
Furfural	1,500
Nitrobenzene and Acid	1,000
Solvent Dewaxing	
Propane	5,500
Mixed Chlorinated Solvents	1,800
Acetone plus Benzene	1,600

* Sources:

1. Zeigenhain, Oil & Gas J., Mar. 3, 1935, p. 83.
2. Wilson & Keith, Refiner, July, 1934, p. 252.
3. Williams, Oil & Gas J., May 16, 1935.
4. Wiggins & Hall, Chem. Ind., Jan. 1936, p. 45.
5. Stines, Oil & Gas J., Mar. 19, 1936, p. 75.
6. Myers, ibid., p. 81.
7. Williams, ibid., p. 97.



The Gulf Oil Furfural extraction unit at Port Arthur, Texas, where the Multi-Sol (furfural) process is employed.

to 7500 barrels per day employing the acetone-benzene process and eight more under construction.

Foster[5] estimates that more than 10,000,000 pounds of different solvents were used during 1936 with a value of $1,200,000 at average bulk prices. About one quarter of the lubricating oil produced in 1936, or about 7,500,000 barrels, is estimated to have been solvent processed.

Treatment by Addition Agents

The petroleum industry has long used certain addition agents to modify its products and supplement the refining methods, such as the soaps used to prepare greases from lubricating oils; and during the past few years has come to rely more and more upon certain special additions to gasoline and lubricants for the attainment of the qualities being demanded by the modern consumer.

Thus, the addition agent of greatest familiarity to the public and probably of the greatest chemical cost to the industry is tetraethyl lead. No figures are available on the use of this material but some pertinent facts warrant examination. Tetraethyl lead is not used alone as an addition agent but is added to gasoline as a component of "Ethyl Fluid," a mixture of uncertain composition containing ethylene dibromide, ethylene dichloride, and naphthalene chloride in addition to the lead compound.

The production of bromine, free and combined, in the United States amounted to two million pounds in 1924 and to about nine million pounds in 1931. This extraordinary increase in the consumption of bromine was due primarily to the use of ethylene dibromide in the "Ethyl Fluid" and showed that the ordinary sources, brines and bitterns, would be inadequate to meet the increasing demands. Experimental work by the Ethyl Gasoline Corporation and by the Dow Chemical Company finally resulted in the construction of a plant at the mouth of the Cape Fear River, North Carolina, for the extraction of bromine from sea water and the formation of the Ethyl-Dow Chemical Company for its financing and operation. This plant also manufactures the ethylene dibromide, using ethylene obtained by the catalytic dehydration of ethanol. In 1934, the plant was manufacturing 15,000 pounds of bromine per day and converting it into ethylene dibromide at a 90 per cent. chemical efficiency.[6]

Other chemicals are also used as shown by the fact that this process, in 1934, involved acidification of the sea water with sulfuric acid at a rate of about 0.27 pounds of 96 per cent. sulfuric acid per ton of sea water, oxidation of the bromides with chlorine at the rate of, theoretically, one mole of chlorine (70.92 pounds) per mole of bromine (159.84 pounds), and absorption of bromine in a soda ash solution subsequently acidified with sulfuric acid for bromine recovery. These chemicals are shipped to the plant.

The figures for bromine in recent years are given by the following table:

Bromine and Bromine in Compounds Sold or Used By Producers in the United States*

1931	8,935,330 lbs.
1932	5,727,561 "
1933	10,147,960 "
1934	15,344,290 "
1935	16,428,533 "

* Bureau of Mines Minerals Year Book (1936).

In a bulletin published in 1936 the Ethyl Gasoline Corporation stated that during the past two and a half years this plant had produced more than 10,000 tons of bromine. About 40 per cent. of the total bromines used in 1935 for preparation of anti-knock gasoline came from sea water and about 28 per cent. of the 17.5 billion gallons of gasoline consumed had bromine from sea water in it.

In the first six months of 1934, 75 per cent. of all gasoline sold contained either "Ethyl Fluid" or the special "Q Fluid." Total sales of tetraethyl lead in 1933 have been estimated at $8,000,000.[7]

To prevent the deposition of gum during storage and the formation of gum during use gasolines now carry dissolved "inhibitors," which in a large measure function primarily as anti-oxidants. Following the lines laid down in the pioneering work of Moureu and Dufraisse in France on anti-oxidants and the considerable American work on specific applications, the petroleum industry has found that the additions of small amounts of such chemicals as quinones, polyhydroxy phenols, a variety of amines, a variety of amino phenols, such products as hardwood tar, etc., materially reduce the tendency of lightly refined cracked gasolines to go off color and deposit gums. A number of trade-marked products are on the market for this use backed by large service organizations and are particularly valuable to the small refiner who cannot afford to support the technical staff required to select and specify the proper treatment for his requirements.

Of course, the petroleum industry does not compare with the textile, paper, and printing industries as a consumer of dyes, but it is, nevertheless, a consumer of no small proportions. Government regulations make it compulsory to color gasoline containing lead, and when it is considered that about three-quarters of all gasoline now sold contains lead, or about twelve billion gallons per year, a considerable dye consumption is indicated even though only very low concentrations are used. A certain proportion of the non-leaded gasoline is also colored for trade-mark purposes. The estimated[8] value of dyes used by the industry at $1,880,000 per year may thus be appreciated.

References:

1 Keith & Forrest, Chem. & Met. Eng. 41 (6), 292 (1934).
2 Chem. & Met. Eng. 38, 76-7 (1931).
3 Schulze & Gregory, Natl. Pet. News, Oct. 7, 1936, p. 34. Schulze & Buell, Oil and Gas J. 34 (22), 42 (1935).
4 Bottomly, Refiner 15 (9), 359 (1936).
5 Foster, Natl. Pet. News, Jan. 6, 1937, p. 59.
6 Stewart, Ind. Eng. Chem. 26, 361-9, (1934).
7 Fortune, December, 1934, p. 174.
8 Natl. Petr. News, Feb. 5, 1936, p. 39.

(To be concluded in the March issue.)

Continued Expansion in the British Chemical Industry

By T. W. Jones* and N. W. Vere Jones

***Editor, The Industrial Chemist**

IT is not easy to give an adequate review of the British chemical industry during 1936. Such a review should be more than a mere cataloguing of events and achievements.

Production during 1936 has increased, the profits of almost all the more important chemical concerns have been maintained and, frequently, materially improved. Research has been extended, and perhaps more important, the realization of its importance continues to grow. Such is the bold outline, and it would appear to be satisfactory enough. Nevertheless there must be few who can contemplate the future with the easy optimism which this satisfactory position apparently justifies.

The hesitation in exports, which for chemicals is definitely downwards, is the result of the continuation of economic nationalism which continues as the dominant economic policy of most of the world. The currency agreement between this country, France, and the United States, and since joined by Holland and Switzerland, is a forward move making for freer international trade and removes many of the restrictions on the entry of British goods into what were the gold bloc countries. Inter-imperial trade has definitely improved during the year and it is hoped that the meeting of Imperial Ministers during the Coronation will result in further improvement. Trade agreements have also played some part in the mitigation of the worst effects of trade restriction; bilateral pacts between this and foreign governments signed during the year have been less noteworthy than in 1935. The Anglo-Danish Trade Agreement of 1933 came up for revision during the early months of the year. The Anglo-Rumanian Payments Agreement provides for the continuance of barter trade between the two countries, chemicals being well represented among the goods which, under the agreement, may be imported into Rumania. Under the Exports Credits scheme the cost of exports up to £10,000,000 to the Soviet Union is guaranteed. Under the Cartel pact signed this year South African producers of steel established their claim to that portion of the South African market which they are able to supply and the balance is to be controlled by the British Iron and Steel Federation and the International Steel Cartel. This should stabilize prices and remove the uneconomic competition of Continental producers. Hopes were held out that the International Zinc Cartel might be reconstituted but efforts proved unavailing and at present the zinc market situation is unsatisfactory.

Following recommendations of the Committee appointed by the Board of Trade the Key Industries' duties are to be extended at rates not less than at present for a further period of ten years. Various minor alterations to the Import Duties order have been made. Oxalic acid was removed from the free list (after having been placed upon it earlier in the year) and increases on lead capsules for bottles, bichromates, and linseed oil are among the most important changes Efforts to remove the tariff on light hydrocarbon oils were unsuccessful.

Prices of chemicals, with the exception of metals, have remained fairly stable throughout the year. Glycerine spurted during the middle of the year but has returned to its former level; the price of crude, calculated on a percentage basis, was at one time considerably higher than that of redistilled. Fertilizers after their usual strength in the spring have sagged during the autumn. Among coal tar products the price of carbolic acid has increased but the tendency of most has been downward, pitch in particular. Acetone has fallen £6 a ton and the tendency of other solvents has been downward. The mercury market has been unstabilized by events in Spain, and prices approximately doubled. Tin continued its downward tendency until it reached a low figure in the summer, but with agreement on restriction having been obtained it has since advanced sharply. Zinc, after the breakdown of the Zinc Cartel, remains a depressed market.

Trading returns of chemical concerns present almost universally a very favorable picture. Outstanding was the Zinc Corporation Ltd.; net profits were more than doubled, rising from £131,227 to £323,996, and as a result the ordinary distribution was increased from 15 per cent. to 45 per cent. Large increased net profits were also registered among others by the following selection: I.C.I. Ltd., British Aluminium Co. Ltd., British Oxygen Co. Ltd., United Gas Industries Ltd., Borax Consolidated Ltd., British Portland Cement Co. Ltd., and Macleans Ltd. Bradford Dyers Ltd. showed a loss of £8,197 against a profit of £48,818 in the preceding year. In the first half year of 1936, 258 public and private companies were registered under the head-

ing "Chemical" at Somerset House with a total capital of £1,747,550, as against 262 in 1935 with a capital of £2,340,578. Important capital issues during the year in the chemical industry have included Unilevers, £3,500,000; Tunnel Portland Cement Co. Ltd., £2,000,000; Colvilles Ltd., £3,100,000; Gas Light & Coke Co. Ltd., £700,000; British Celanese, £500,000; Kellner-Partington Paper Pulp Co. Ltd., £1,100,000; Dufay Colour Ltd. and Chromex Ltd. effected an amalgamation with a capital of £750,000. Alfa Laval Co. Ltd. have bought British Separators Ltd., I.C.I. have acquired du Pont's interest in Nobel Chemical Finishes.

Heavy Chemicals

It is doubtful how far the production of sulfuric acid can be regarded any longer as a reliable index of general production. The falling off in output during the middle of 1935 does not appear to have been accompanied by a proportional falling off in general production. Reversal of the decline in production by the contact process in proportion to that produced by the chamber process has become more marked during 1936. This can be attributed to the more intensive operations of the zinc smelting industry in South Wales, as foreshadowed in these pages last year. The percentage of the total sulfuric acid produced from zinc smelter gas increased from 10.68 per cent. during the first six months of 1935 to 13.23 per cent. in the corresponding period of 1936. Pyrites still accounts for about 50 per cent. of the raw material for sulfuric acid production, while the proportion from spent oxide shows a slight decrease. Production of sulfuric acid by the contact process from gases containing H_2S, *e.g.*, from the distillation of coal, continues to progress. At least two such plants are in operation in Germany, and the contract for plant of this type has recently been placed in this country. The process is carried out entirely in the gaseous phase, vanadium is used as the base for the catalyst and is maintained at a temperature of 350–400°C. The sulfuric acids finally separated from the excess water by fractional condensation.

The importation into this country of soda in form either of soda ash, crystals, carbonate or bicarbonate has been almost completely arrested. Exports of both carbonate and caustic have also declined, attributable in part to increased production in Japan. Exports of salt continue to improve, as does the salt industry as a whole. The preparation of crystalline caustic soda by a new process is heralded. The concentrated lye is sprayed into an immiscible liquid; *e.g.*, an hydrocarbon oil; and by partial pressure distillation both water and liquid evaporate well. The dehydrated caustic separates as a fine crystalline powder, crystal size being determined by the rate of evaporation. The process may soon be tried out in America on the full plant scale.

The British Oxygen Company celebrated their fiftieth jubilee during the past year by the issue of a substantial share bonus of £1 Ordinary shares for each £7 Ordinary stock held. The company expanded productive capacity during the depression and are now reaping the benefit. They have also been negotiating for the formation of a new company, The Caledonian Power Company, for the supply of electricity mainly for an electro-chemical undertaking of the parent company near Fort William. The same firm, in co-operation with the Hammond Lane Foundry, has established the oxygen industry in the Irish Free State. The articles of association of the Company are to be altered so as to enable them to manufacture calcium carbide.

Alcock (Peroxide) Ltd. are planning a new plant for the production of hydrogen peroxide and for salts by the electrolytic method. The firm is also pioneering in the manufacture of sodium metasilicate.

The new oxalic acid plant of the I.C.I. at Widnes came into operation during the year, and home produced acid is now available for the first time. The main grade is a white crystalline free flowing material of uniform crystal size.

Fertilizers, etc.

There has been considerable falling off in exports of ammonium compounds. The home market on the other hand has improved; for the twelve months ended June 30, 1936 consumption of ammonium sulfate shows an improvement of 6 per cent. on the previous year. In spite of this improvement in ammonium sulfate, the newer nitrogenous fertilizers continue to make headway, particularly nitro-chalk.

Germany has been particularly active in the field of nitrogenous fertilizers during the past year, the first quarter's shipments were 234,500 metric tons as compared with 208,574 in the preceding year and 155,656 in 1934, the main increase being for ammonium nitrate.

Cyanamide continues to grow in popularity. As a weed killer, dusted in the form of very fine powder, it has been subjected to many trials, and its use is growing. Another newcomer to the weed killer-cum-fertilizer group is ammonium thiocyanate, now under extensive and encouraging trials.

There has been a slight rise in the export of other fertilizers, although still the drop in 1935 has not yet been wholly recovered. The expansion of Fison, Packard and Prentice Ltd. has resulted in a rise of trading profits of 16 per cent. towards which the import duty on superphosphate has undoubtedly played its part. The opening of the new factory of National Fertilizers Ltd. at Avonmouth represented an important addition to the supply of superphosphates.

Home consumption of superphosphate for the 12 months ending June 30th 1936 shows almost no change over 1935, a not unsatisfactory situation since the early spring was most unfavorable. Imports of superphosphate continue to drop rapidly, in 1936 they will be little more than half the value of 1934.

Use of borax as a fertilizer is now established and recognition of the fact has been the formation during

the preceding year of the Boron Agricultural Bureau, a central organization for the provision of information relating to the uses of borax in agriculture.

Metals

The past year has seen considerable expansion in the metal industry, attributable in part to the expansion of the armaments industry. The zinc market has continued to give some anxiety. Adequate protection to home producers is still, in the opinion of the chairman of the Zinc Corporation, lacking. During the year price fluctuations have been smaller than in preceding years, but the average figure has remained at a very low level, around £14. The market was considerably puzzled by the failure to form a new zinc cartel during the summer. It appears from the American Bureau of Metal Statistics that the productive capacity of present plant is some 50 per cent. more than is being produced. The flow of concentrates exceeds the consumption of zinc, but the terms on which smelters work still show a profit with the result that they continue to increase output. Another noteworthy feature is that the new electrolytic process enables purer zinc to be produced at a lower cost than the older g.o.b. The Copper Restriction Scheme which was provisionally agreed upon during 1935 has been confirmed during 1936, thereby automatically extending the scheme until 1938. This has reacted very favorably on the price of the metal which improved by nearly £10 a ton. The gap between consumption and production still continues.

Expansion of the home light metal industry continues. The Magnesium Castings and Products Ltd. have increased their capital, one of the parent bodies of which is Murex Ltd., which is also interested in Magnesium and Metal Alloys.

Magnesium Electron Ltd. have established a new factory at Clifton, for the production of raw magnesium and Electron alloys. The output is considered to be sufficient to meet the present calls of British industry, considerably expanded by the recent increase in the Royal Air Force.

A development council for the lead industry of the Empire was formed, mainly for the purpose of giving authoritative information on new and improved methods of manufacturing lead and its products.

There is little to report of technical advances in the non-ferrous metal industry. Considerable researches on the hot tinning of copper have been carried out by the International Tin Research & Development Council, which indicates that the production of porous and irregular tin coatings on copper is associated with the inclusion of cuprous oxide in the copper base. The solution of the problem lies either in oxygen free copper or by reduction of the surface cuprous oxide by suitable pretreatment. The use of rhodium, a by-product in the platinum refining industry, for giving silver an untarnishable film is reported.

On probably no other single subject is there such universal insistence as on the vital necessity for this country to re-develop her coal industry *via* petroleum; this is the one subject on which communist and industrial magnates have formed a united front. Hydrogenation and low temperature carbonization of coal can now be accepted as part of Great Britain's industry.

During the past year among the more notable events in this field have been the opening up of the fourth plant by Low Temperature Carbonisation Ltd. at Bolsover with a daily capacity of 500 tons of coal. Total annual output of these four plants is placed at 12,000,000 gallons of petrol and crude oil and 380,000 tons of coalite.

A new coal distillation plant was opened by National Coke & Oil Co. at Erith during the summer. Daily coal capacity is placed at 150 tons with an output of 1,800 gallons of petrol and 3,000 of Diesel oil. Similar plants are foreshadowed at Manchester, Glasgow, Edinburgh, and Cardiff.

Increased Use of Methanol as Motor Fuel

An entirely different line of attack is being made by Duffield Coal Products Ltd. Experiments on a small scale plant have been in progress since 1931 and a full scale plant has now been designed as the result. The coal is transformed into water gas of requisite analysis for conversion into methanol. Thus, instead of a possible 15 gallons of petrol from a ton of coal by other processes it should be possible to obtain 140 gallons of motor fuel from each ton of coal. The probable cost of production is estimated at between 2½d. and 3½d. a gallon. Methanol, as a motor fuel, continues to find increasing demand.

Expansion of the iron and steel industry has necessarily been accompanied by a corresponding expansion of the coke oven industry. A new coke oven plant costing £250,000, the first of its kind in Scotland, was opened in the spring at the Govan Iron Works. Dorman Long & Co. opened the largest coke oven plant in the country and the second largest in Europe at their Cleveland Steelworks. The cost exceeded £600,000. The plant includes a complete by-products plant which, when in full operation, will produce weekly 200 tons of ammonium sulfate and 70,000 gallons of benzol. The semi-direct system of ammonia recovery was designed by Simon Carves Ltd. Refining of the crude tar and benzol will be carried out at the Company's central distillation plant at Port Clarence. Another example of coke oven expansion was the Workington plant of United Steel Co.'s Ltd. This plant has an estimated capacity of 5,000 tons of coke per week and is equipped to recover tar, ammonium sulfate, motor fuel, toluol and naphthalene as by-products from the gas produced.

Satisfactory results of gas dehydration by the glycerine method have been obtained by the Luton Gas Co. The process employed is that developed by Kirkham, Halett & Chandler Ltd. The glycerine required to re-

place losses in the process averages 2.7 tons per 1,000 million cu. ft. of gas dehydrated, working out at a cost of 0.017d. per 1,000 cu. ft. The operation of the plant presents no difficulties. During the year Great Britain signed the International Coke cartel regulating the sale and export of coke. Quotas have been fixed as follows:—Germany 53 per cent., United Kingdom 21 per cent., Holland 17 per cent., Belgium 7 per cent., and Poland 2.7 per cent. The minimum price is fixed at 19s. 6d. a ton, f.o.b. harbor.

Although figures for the export of soap continue to decline, there has been increased activity in the home industry. Lever Bros., in their annual report of 1936, announced that for the third successive year their home sales had been a record. Very guarded references were made by the chairman to an agreement with I. G. for the world's marketing rights of a recent discovery described as "an alternative to soap." Our curiosity has not yet been publicly appeased. Various extensions to the company's activities are announced, and include a new factory at Silvertown for British Oil and Cake Mills, the construction of four 9,000 ton vessels to be run by a Rotterdam firm on their behalf, and a preliminary agreement has been signed whereby they lease the oil mills of the Etablissements Verminck in the South of France. Thomas Hedley & Co. are also preparing to increase production by the acquisition of a further five acres of land at Trafford Park. The new plant should enable the firm to double its present production.

The boom in the building industry has resulted in increasing activity in the cement and similar industries. One of the biggest industrial developments in the north is the scheme being launched by the North Lincolnshire Portland Cement Co. A cement factory is in construction at South Ferriby and to it will be brought limestone by overhead cable from the Lincolnshire wolds; a new quay on the Humber is also projected. The Alpha Cement Co. has taken over the Metropolitan Cement Co. in order to cope with trade in the London Area. The Associated Portland Cement Co. is also increasing its productive capacity, notably by a large extension to the Swanscombe works. The Cement Makers' Federation, set up in 1935, has reduced prices in certain markets, and is also occupied with research and the extension of the uses of Portland cement.

A notable addition to refractories is the Saxpyre Brick made by General Refractories Ltd., which together with high heat resisting qualities withstands the action of basic slags without spalling. A subsidiary organization, International Diatomite Co., is pioneering in the use of diatomite for partition slabs, plaster boards and the like. It combines extreme lightness with sound and heat resisting qualities.

Progress continues to be made in the production of woven asbestos; many difficulties have been encountered such as extremely short staple, and reluctance to be dyed, but these are being overcome.

I.C.I. (Metals) Ltd. have acquired the manufacturing and selling rights of a remarkable new alloy "Everdur." It is a copper-silicon-manganese alloy which combines the tensile strength of medium carbon steels with the non-rusting and corrosion resisting properties of copper. It has a high fatigue limit, good machinability, can be readily cast, hot or cold worked and is easily welded.

Water softening materials of the ion-exchange type continue to be developed. One interesting innovation by United Water Softeners Ltd. has been their formation from lignite and similar materials. The finely crushed material is treated with 93 per cent. sulfuric acid. The temperature of the mixture rises and is then further heated. The sulfuric is filtered off and washed out with water. It is believed that the first reaction is oxidation followed by a condensation with the elimination of water and finally the absorption of sulfur into the carbonaceous material. The final product appears to be either an organic sulfonic acid derivative, or a sulfuric acid ester. It possesses very high ion-exchange properties, metallic cations in solutions brought into contact with it being replaced by hydrogen.

Rex Campbell & Co. are marketing a new emulsifying base under the name Trigamine which is claimed as capable of replacing triethanolamine. It is less alkaline and somewhat more viscous than the latter. It is immiscible with most organic solvents, but completely soluble in water, glycerine and 50 per cent. alcohol. It forms soaps with fatty acids which do not discolor with age. It can be used as a dispersing agent for casein and shellac and gives a very flexible film.

Very satisfactory results have been obtained by Metropolitan Vickers Electrical Co. with the use of phenol-formaldehyde resins molded with a fabric reinforcement for the bearings of rolling mills. They will stand up to pressure exceeding 4,000 lbs./sq. in. For high pressures grease lubrication is recommended, but up to 1,500 lbs./sq. in. water lubrication is sufficient. The life of such bearings is six to ten times as long as bronze with considerable saving of power.

The use of welding in fabrication continues to make rapid advances. Among the more interesting have been the largest pressure vessels so far made to Lloyds Class (1) Code. They consisted of four evaporators made by G. A. Harvey & Co. Ltd., to the order of Tate & Lyle, and are designed for a pressure of 250 lbs./sq. in. with an internal diameter of 11 ft. and a total height of 26 ft. 9 in.

As oxygen affects the surface of molten metal it is not possible to obtain welds with a perfect appearance and finish. Barimar Ltd. has been conducting researches to carry out the welding in an atmosphere of hydrogen.

The problem of designing joints for very high pressure service, *e.g.*, up to 40,000 lbs./sq. in. has been tackled by I.C.I. (Alkali) Ltd. at Northwich, and has been to a large extent solved by the Wave Ring Joint.

Copper Sulfate

An Innocent Victim of European War Fever

THE so-called heavy industrial chemicals as a group have exhibited a remarkable degree of price stability through the subsequent periods of boom years, deflation, depression, and recovery. Yet certain ones, notably the salts of the commoner metals, have been subject to wide fluctuation in the past ten years and copper sulfate is certainly an outstanding example.

Early in 1929 the market for blue vitriol (the common name for copper sulfate) was quoted at \$6.20 per hundred pounds. Slipping steadily it reached a depression low of \$2.75 in 1932 and by the end of 1936 had recovered to \$4.45. Within the past three weeks several successive price advances have been announced, the last on January 15th bringing the current quotation to \$4.85. Even the oils and fats, which have had meteoric falls and rises since 1929, fail to show much wider price fluctuations.

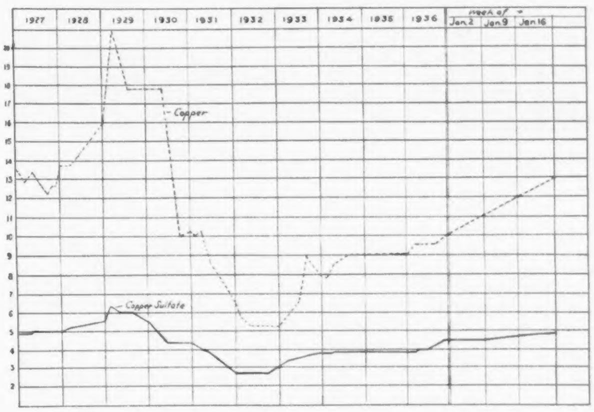
The copper content of copper sulfate is approximately 25 per cent. Quite naturally then the price trend of the salt closely follows the "ups and downs" in the market for the metal. At times minor price fluctuations in blue vitriol have occurred independent of changes in the metal, the result of severe competition between suppliers, but such situations have always been of a temporary nature. The controlling factor is the price of copper.

A study then of the sulfate market is in reality a study of the conditions surrounding the national and international aspects of the market for the red metal. In certain respects the position of copper sulfate is somewhat analogous to the unhappy position of any by-product.

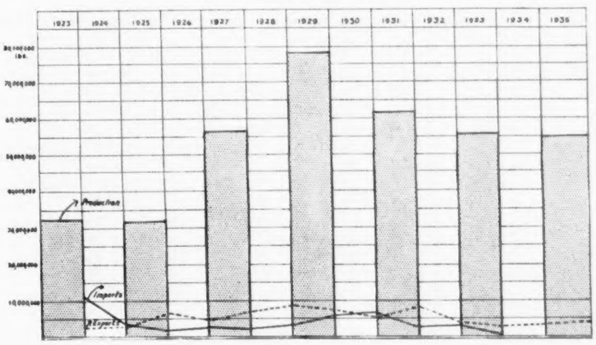
In 1929 copper reached a peak of 21 cents, declined as low as five cents in 1932, recovered slowly through 1933, 1934 and 1935 to 9¼ cents, and was quoted at 10 cents at the close of last year. In the first three weeks of 1937 it rose three cents, to the highest level since April 1930, when the price averaged 15.74 cents.

What has caused this remarkable price recovery and especially what has forced the sensational price advances since the turn of the year? In a word the answer is largely speculation made possible by the rearming of Europe for the next war. This is said without belittling for a moment the forces of national and international recovery which have gradually brought about improved demand, decline in the huge surplus stocks, and a natural improvement in the price structure. But very definitely the spurt in the first few weeks of the current year is the result of feverish speculation in London. Europe is finding itself woefully short of war-essential raw materials. Momentarily copper is holding the center of the stage, but other commodities, rubber, cotton, petroleum, etc., are bound to receive attention, unless the war fever and armament races subside quickly.

American copper producers have endeavored to remain

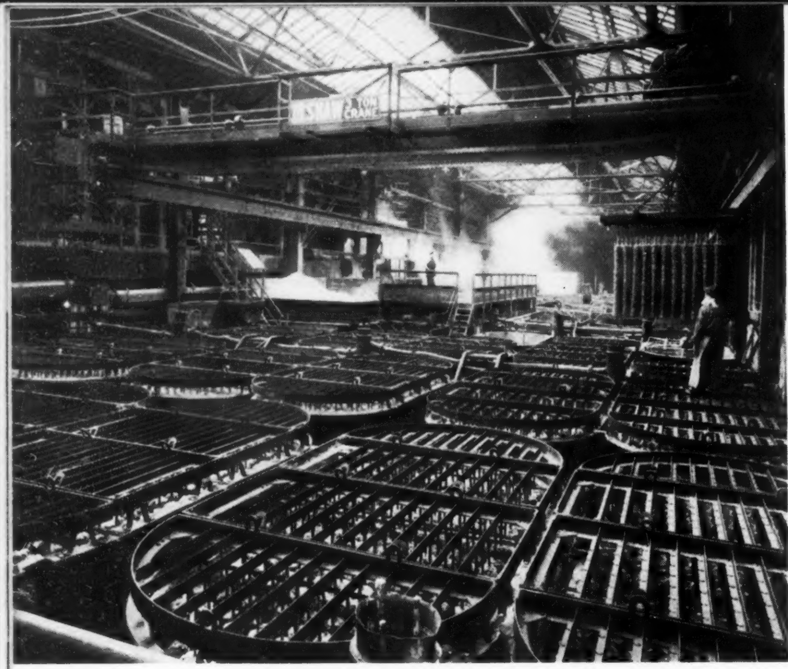


A graphical study of price trends for the past 10 years indicates how closely quotations for copper sulfate follow the market for the metal. The sharp increases since the turn of year are shown.



Production, imports, and exports of copper sulfate since 1923.

The statistical improvement in copper in the past 24 months is shown in the above chart. Stocks have declined, while deliveries have improved rapidly.



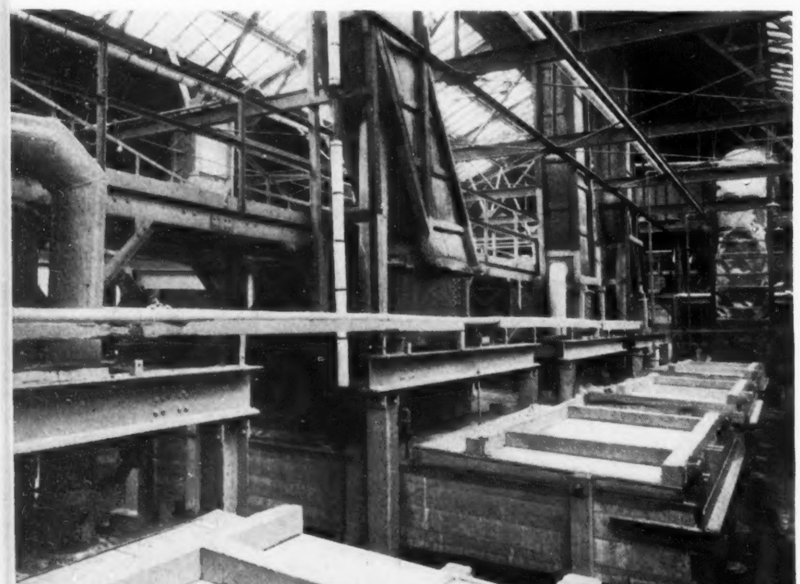
Crystallizers in the copper sulfate department of the Nichols Copper Co. at Laurel Hill, L. I.

aloof from the European madness by successively raising quotations here to levels just under the London market. But it is extremely difficult to prevent a flow of the metal abroad when this country is the largest producer and foreign buyers are frantically outbidding one another. The insularity of the U. S. copper market has been marked in the past few years. Where, formerly we once provided the world supplies, in the past few years we have ceased to be exporters in any important commercial sense. Our home markets, on the other hand, have been afforded the protection of a four cent tariff.

The policy pursued by the domestic copper producers to check the export of unusually large amounts has been fairly successful to date, but it is highly problematical how much further this line of defense will prove satisfactory. Already the domestic consumers of copper are chafing at the rapid price rise and, according to newspaper reports, are threatening to complain to the Federal Government.

But just what the copper producers can do about the situation is not very clear. While they have guarded

Copper Sulfate Evaporators



the export of virgin metal the export of American copper scrap has increased sensationally.

The international situation was eased somewhat by the temporary suspension of the copper-restriction plan on January 15th and a slightly easier tone was noted in the London market. Yet few believe that the suspension will be temporary; it is expected that the demand will continue to increase rather than diminish, and that still higher prices are inevitable. Fifteen cent copper by March is a strong possibility.

After March some easing of the market may take place. With restrictions off the big foreign low-cost producers can rapidly step up output. In 1935 the African developments at Katanga and in Rhodesia produced 300,000 tons of virgin copper and this figure can probably be doubled if the present demand holds.

Yet there is no fear of an international copper shortage for any lengthy period. Sufficient productive capacity exists both abroad and in the U. S. to supply even the heavy demands of a world-wide war. This country possesses the equipment to turn out 1,500,000 tons annually and foreign producers could produce 2,000,000 tons. The current critical situation has simply been caused by the sudden overwhelming demand for which the copper producers naturally were unprepared after six years of curtailed activity.

Scarcity of Sulfate Stocks

It is small wonder that with a rapidly rising copper sulfate market producers have been literally swamped with orders. Stocks which are the lowest in several years are not much more than one-third of normal. Producers are finding it extremely difficult to fill consumers' requirements and exports are at a standstill. Those manufacturers who produce from secondary metal have stepped up operating schedules very rapidly in the emergency. With the crest of the seasonal demand very close at hand a very tight price situation is generally anticipated over the next several months. There are even a number of unusually well-informed factors in the market who anticipate a greater percentage of price increase in copper sulfate than is likely in the metal itself and they justify this stand through the very seasonal nature of the consumption of blue vitriol.

By far the largest tonnages of copper sulfate ($CuSO_4.5H_2O$) consumed are used for fungicidal, insecticidal, and algicidal purposes. Bordeaux mixture (copper sulfate and lime) is one of the most common and widely employed fungicidal sprays. The use of copper-lime dust is increasing rapidly. Copper sulfate is the basis for the production of a number of other important copper salts. Copper sulfate is used to some extent in the textile field, in swimming pools, and small tonnages are consumed in printing inks, as a dehydrating agent (in the anhydrous form), in paints, in process and photo-engraving, as a preservative for a variety

of products, and for coloring metal. The use of copper sulfate in railroad signal batteries has declined practically to the vanishing point.

At times, depending upon the state of the metal markets, considerable quantities are consumed in the recovery of metal values by the method of differential flotation, which makes it profitable to treat material carrying low metal values.

Ever-increasing quantities are being employed in water reservoirs for the destruction of microscopic organisms which impart fishy, aromatic, or grassy odors to the water. The simplest method of application is to drag burlap bags, containing about 50 pounds each, through the water by means of rowboats, taking a zig-zag course so as to triangulate the surface of the water. Wind, waves, diffusion and gravity admix the streaks of treated water with the remainder. More elaborate procedures than this have been developed and are in use in many large reservoirs and watersheds, but the principle, of course, is unchanged.

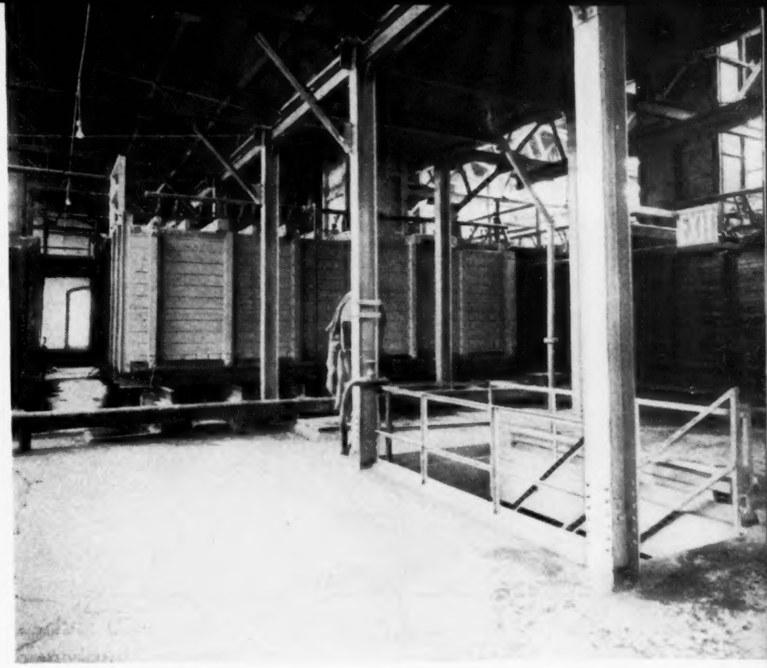
Copper sulfate is produced in this country largely as an incident in the electrolytic refining of copper. It can, and is, of course, produced by the direct reaction of secondary metal with dilute sulfuric acid in the presence of air, but such production must be sold in competition with the reasonably stable production of the copper refiner whose costs, except in very unusual circumstances, quite obviously are under those not engaged in copper refining.

Economics of Manufacture

To thoroughly appreciate the economics involved it is necessary to delve somewhat into the copper refining operation. Plates of the metal from the converter or blister copper are immersed in a bath of copper sulfate solution acidified with sulfuric acid, and made the positive electrodes or anodes in the bath. The cathodes consist of thin sheets of pure copper previously deposited on copper plates. The impurities gold, silver, and platinum metals together with a small quantity of copper fall as an anode slime. The slime is then treated to recover the precious metals that may be present. At the huge plant of the Nichols Copper Company at Laurel Hill, Long Island, the copper content in the slime is employed for the manufacture of copper sulfate instead of any attempt being made to recover it as the metal. Such procedure, of course, insures the production of a copper particularly free from impurities and supplies the raw material for a constant supply of copper sulfate. The remaining steps in the manufacture of copper sulfate consist largely of the thoroughly well understood chemical engineering operations of evaporation and crystallization.

Included among the principal producers of copper sulfate in this country are:

American Smelting and Refining Corporation, San Francisco, Calif.



Copper Sulfate Oxidizers

Irvington Smelting and Refining Works, Irvington, N. J.
Kirk Manufacturing Company, Los Angeles, Calif.
Mountain Copper Company, San Francisco, Calif.
Nichols Copper Company, New York City. This company also operates a second plant at El Paso, Texas.
Superior Copper Products Company, Chicago, Ill. This company is a subsidiary of Nichols Copper Company.
The Tennessee Corporation, Copperhill, Tenn.

The largest by far of these plants is that of Nichols Copper at Laurel Hill which has a capacity of approximately 28,000 tons annually. Most of the others have a productive capacity somewhere in the neighborhood of three to four thousand tons annually. It is said that the smallest economically feasible plant is one with a minimum capacity of 3,000 tons annually.

The preliminary report on copper sulfate for 1935 by the Bureau of the Census lists 14 producing establishments geographically distributed as follows: California, 3; Illinois, 2; New Jersey, 2; New York, 2; Idaho, Montana, Pennsylvania, Tennessee, and Texas, 1 each.

Packing copper sulfate in barrels. Photographs courtesy of the Nichols Copper Co.

Copper Sulfate Statistics

Year	Pounds				Dollars			
	Production	Imports	Exports	Consumption*	Production	Imports	Exports	Consumption*
1923	32,304,421	10,162,549	2 290,905	40,176,065	$1,777,663	$517,524	$130,213	$2,164,974
1924	....	3,886,013	2,988,039	....	....	162,472	142,626	....
1925	32,296,583	1,805,095	6,139,344	27,962,334	1,683,788	92,930	285,870	1,490,848
1926	....	2,558,584	4,798,620	....	....	117,269	231,175	....
1927	56,666,812	1,978,726	6,206,904	52,438,634	2,774,400	88,748	320,653	2,542,495
1928	....	3,611,842	8,666,899	....	....	172,256	455,023	....
1929	78,669,112	5,388,743	6,419,688	77,638,167	4,344,538	272,859	368,481	4,248,916
1930	....	5,964,378	5,061,554	....	....	283,000	252,614	....
1931	60,816,515	2,643,741	7,190,919	56,269,337	2,177,070	105,112	276,575	2,005,607
1932	....	3,234,058	4,132,529	....	....	86,764	114,579	....
1933	55,949,580	46,959	2,749,299	53,247,240	1,403,079	1,526	92,964	1,311,641
1934	....	....	3,858,629	....	....	....	128,756	....
1935	55,955,439	....	4,508,271	....	1,892,549	....	142,467	....

* Consumption represents production plus imports and minus exports.
Imports, exports are from "Foreign Commerce and Navigation of the U. S."
Production figures are from the Census of Manufactures.

Copper sulfate is packed in barrels of 400 and 450 pounds (depending upon the manufacturer); in kegs of 100 and 250 pounds; and in bags of 100 pounds.

Copper sulfate is available in the following forms:—powdered, fines, small and large crystals, snow crystals, and mono-hydrated. The manufacturers, in addition to selling direct, distribute through a large number of dealers, jobbers, and brokers. Such sales methods are vital in the case of chemicals where consumption is widely distributed and where, in many cases, relatively small quantities are purchased.

Industry's Bookshelf

Physical and Chemical Constants and Some Mathematical Functions by G. W. C. Kaye and T. H. Laby, Longmans, Green & Co., 114 5th ave., N. Y. City, 162 pp., $4.75.

To the research field this valuable statistical work needs no lengthy review. Sufficient to say that the 8th edition has had a considerable measure of revision and a number of important additions have been made.

The Thermochemistry of the Chemical Substances by F. Russell Bichowsky and Frederick D. Rossini, Reinhold Publishing Corp., 330 W. 42nd st., N. Y. City, 460 pp., $7.00.

Present book is a complete revision and extension of the first attempt ever made to collate all the published data involving heats of reaction and to prepare therefrom a self-consistent table of the "best" values for the heats of formation of the chemical substances.

Inorganic Pharmaceutical Chemistry by Dr. Charles H. Rogers, Lea & Febiger, Washington Square, Philadelphia, 724 pp., $7.00.

The 11th decennial revision of the U. S. Pharmacopoeia and the 6th edition of the National Formulary made it necessary to revise and enlarge this standard text-book of inorganic pharmaceutical chemistry for students of pharmacy and pharmacists.

A.S.T.M. Standards, Part 1 Metals, Part 2, Non-Metallic Materials, American Society for Testing Materials, 260 S. Broad st., Philadelphia, Part 1, 898 pp.; Part 2, 1477 pp. Either part, $7.50; both parts, $14.00.

The Society has just issued this triennial publication of all the standard specifications, methods of tests, recommended practices and definitions formally adopted.

Jute and Substitutes by N. C. Chaudhury, Chemical Publishing Co., 148 Lafayette st., N. Y. City, 249 pp., $6.00.

This is the 2nd edition of a complete treatise on the cultivation, manufacture and trade in jute and jute substitutes.

Principles of Electrical Engineering by Grover C. Blalock, McGraw-Hill Book Co., 330 W. 42nd st., N. Y. City, 584 pp., $4.00.

While this book is designed chiefly as a text-book for the non-electrical student it will be found valuable by chemists and chemical engineers, plant managers, etc., who desire to add to what may perhaps be a very sketchy knowledge of practical electricity and applications.

An Introduction to The Preparation and Identification of Organic Compounds by Robert D. Coghill and Julian M. Sturtevant, McGraw-Hill Book Co., 330 W. 42nd st., N. Y. City, 226 pp., $1.75.

In this course the authors require the students to make just half as many preparations as formerly. The remaining time is devoted to a form of qualitative organic analysis. Much greater interest on the part of the student invariably follows.

Handbook of Chemistry and Physics by Charles D. Hodgman, Chemical Rubber Publishing Co., Cleveland, Ohio, 2023 pp., $6.00.

The 21st edition of this accepted standard handbook has been greatly revised and enlarged and additional valuable statistical data added.

Salts and Their Reactions by Dr. Leonard Dobbin and Dr. John E. Mackenzie, 246 pp., E. & S. Livingstone, Edinburgh, Scotland, 6/-net, postage 6d.

Presents a very carefully thought-out course of laboratory experiments and instruction decidedly different from the usual method of attack employed in American books designed for the same purpose.

The Principles and Practice of Textile Printing by Edmund Knecht and James Fothergill, revised by James Best Fothergill, Charles Griffin & Co., 42 Drury Lane, W. C. 2, London, England, 1048 pp., 70s. net.

The 3rd edition of this most voluminous, detailed and authoritative work is now available. The last one printed nearly 12 years ago was quickly exhausted. The present volume has been greatly enlarged and thoroughly brought up to date. As a practical working guide for the textile printer it has no equal.

Die-Casting by Charles O. Herb, The Industrial Press, 148 Lafayette st., N. Y. City, 300 pp., $3.00.

The literature is woefully weak on modern text-books on this subject and the present volume fills admirably a long-felt need.

BARYTES

Barytes is a vital raw material in the paint, rubber, textile, glass, leather, and ink industries and in the manufacture of several chemical specialties. Views on this page show the processing of Barytes at an Italian mine. Above, the millstones that grind the soft, pure-white material. Right, the only treatment is one with water—no acids, no bleaching.

At the left is an interior view of the Barytes mine, while at the right is the mine-head. The material is transported to the milling building by means of a wire rope-way.

Below, the storage sheds for the pure-white Barytes. From here it is shipped by motor lorries to Genoa for export to all parts of the world. Photographs, courtesy of Wishnick-Tumpeer, Inc.

The Future of Synthetic Yarns

Projected Enlargements of Plant Capacities Insure Increasing Consumption of Important Industrial Chemicals

By Edward B. Laufer

With a production of 277,626,000 pounds in the last year, synthetic yarn production has trebled in the past decade. Present expansion plans will probably bring production capacity up to 400,000,000 pounds by 1938. This will increase the market for chemical raw materials in this field to approximately $75,000,000 annually.

IN the rayon industry, chemical companies have a large and growing customer. Expansion in this synthetic fiber field has been truly phenomenal. This expansion has suffered almost no set-back during the depression, and the last peak year for general business—1929—has been far surpassed. Only in 1932, which was the low point of the general business recession, did rayon sales react appreciably, and in that year consumption was in excess of 1929. Despite the present substantial stature of the industry, production (and consumption) during recent years has been steadily greater, and in 1936 a new record was again made with a volume of close to 280,000,000 pounds of yarn, or three times the production of ten years ago.

U. S. Production of Rayon Yarn

1927	75,555,000 pounds	1932	134,670,000 pounds
1928	97,232,000	1933	213,498,000
1929	121,399,000	1934	208,321,000
1930	127,333,000	1935	257,557,000
1931	150,879,000	1936	277,626,000

Sources: Census of Manufactures. "Rayon Organon."

Progress like this is not accidental but is usually the result of sound development. This has been particularly true of the rayon industry, the factors contributing to such development being (1) technical improvements substantially lowering costs, (2) a vast improvement in quality of product over a comparatively short period of years, and (3) materially lower selling prices. From every phase, the technical problems have been intensively pursued to the extent that recoveries in treatment chemicals have been greater and material costs lower. The product is nothing like that of the earlier years, strength now being greater, many shortcomings having been ironed out—its present quality status is acknowledged by a rayon fete at the Beaux Arts Ball. Favorable prices have made rayon a competitor of spun cotton. Stable to declining prices for basic chemicals have likewise contributed to this success. Had the rayon industry been a converter of materials more directly derived from vegetable or animal origin, in which price fluctuations of a cyclical or trend nature were an influence, the picture today might well have been different.

Chemistry and chemical engineering are largely responsible for the improvements made over a period of years. Such changes have been gradual and not sensational, but their cumulative effect has constituted an underlying force. Improvements have taken the prosaic form of refinements—of better fiber lubricants, of sizing materials, dyes, coatings, etc. Machinery has been speeded up, been made more resistant to corrosion and given a longer life. Finer filaments are developed, spun-dyed yarns are created and even shortcomings of yarn are utilized. The characteristic of acetate to fuse or melt under heat and pressure is now used to create finishes for style fabrics, to make fused collars.

As authentic data on the total investment in chemical equipment and spinning apparatus are not readily available, and as much rayon expansion is quietly conducted, annual expenditures for plant and process can only be guessed at. That such additions and betterments were made and were conducive to increasing economy is reflected in the biennial Census of Manufactures. Thus, taking the halcyon (and comparatively high cost) year 1929 as a base, it is found that 1935 rayon yarn production was nearly two and one-half times as great, that the total cost of materials, fuel and purchased electric energy was not twice as much, but that wages increased only 14%. Or expressing it in another manner and over a longer period, approximately 5,100 pounds of rayon yarn (not to mention allied products) were produced in 1935 per average wage-earner against 2,700 pounds in 1925.

Production of Rayon and Allied Products

	1925	1927	1929†	1931	1933	1935
Establishments	14	19	29	32	34	32
Wage Earners	19,128	26,341	39,106	38,735	44,306	50,550
Yarn: Pounds*	51,902	75,555	116,633	150,879	213,498	257,557
Value*	$88,007	$106,469	$140,846	$112,282	$129,202	$146,067
Average	$1.70	$1.41	$1.21	$0.75	$0.61	$0.57
Other Products*	$53	$3,420	$8,699	$20,350	$27,729	$39,091
Total Products*	$88,060	$109,889	$149,545	$132,632	$156,931	$185,159
Materials, etc.*	$18,478	$25,748	$33,335	$36,180	$44,031	$64,505
Wages*	$22,975	$28,649	$44,697	$38,231	$38,613	$50,693
Balance before other Expenses*	$46,607	$55,492	$71,513	$58,221	$74,287	$69,961

Source: Bureau of the Census
* In thousands
† Shipments

Technically, the industry affords a fine example of practical application of scientific discoveries, an applica-

tion which has been healthy and vigorous. Economically, during some years it offers an example of hasty growth, with resultant prevalence of bad trade practices.

Inter-Process Competition Keen

Gains such as these are often not without their disturbances. In the rayon industry, however, the major influence, not predatory, has been inter-process rivalry between the viscose and the acetate processes. Because of low cost and wide acceptance, viscose yarn by far commanded most of the rayon market, but in 1933, and again in 1935, acetate, under the leadership of Celanese Corporation, scored great bulges. The added volume encouraged price reductions, with the result that the vast premium on acetate yarn has at last disappeared. The greater strides in the acetate division have meant much to makers of acetic acid and acetic anhydride.

Approximate U. S. Production of Rayon by Process

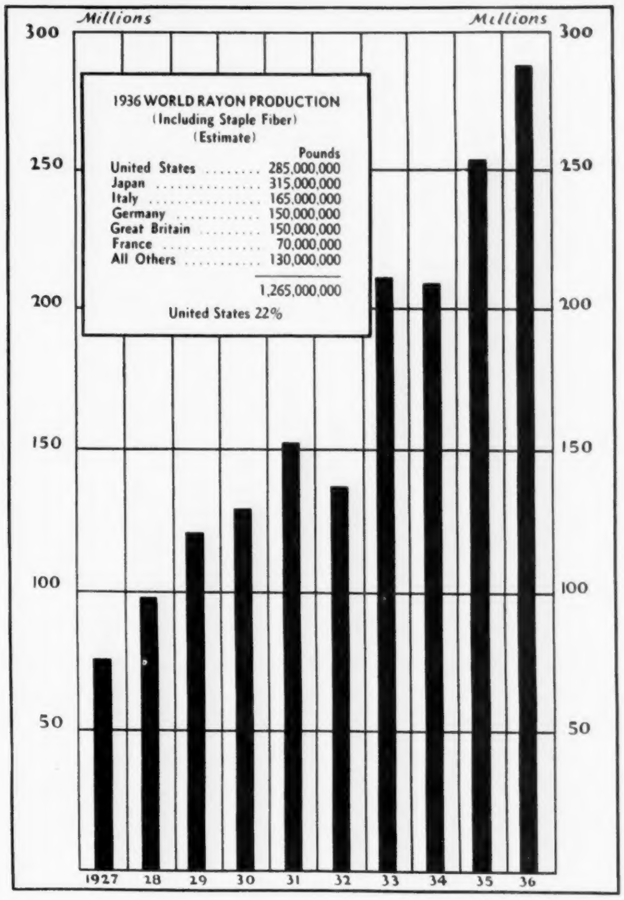
	Viscose Yarn		Acetate Yarn		
	Amount	Price	Amount	Price	Total Amount*
1927	63,000,000 lbs.	$1.49	5,100,000 lbs.	$2.90	75,500,000 lbs.
1928	81,600,000	1.50	6,000,000	2.50	97,200,000
1929	103,300,000	1.25	8,400,000	1.90	121,400,000
1930	109,300,000	1.06	9,800,000	1.45	127,300,000
1931	128,000,000	.75	15,600,000	1.25	150,900,000
1932	106,000,000	.66	18,300,000	.90	134,700,000
1933	158,700,000	.61	41,000,000	.90	213,500,000
1934	163,000,000	.59	38,000,000	.80	208,300,000
1935	195,000,000	.57	55,600,000	.70	257,500,000
1936	205,000,000	.59	62,700,000	.60	277,600,000

* Includes small amounts of nitro-cellulose and cuprammonium yarns.
Sources: Production of acetate, total production and certain other data are from Census of Manufactures and from "Rayon Organon."

The two products—viscose and acetate yarns—cannot be separated into water-tight compartments. There are overlapping qualities and functions, but also a difference in the feel or "hand". There are many uses to which both may be put, in some instances one to supplement the other, as in men's hosiery for cross-dyeing applications. While the rivalry between the two products is expected to continue to be keen, there is no reason at this stage to expect one product to displace completely the other. However, any method which will cut the cost of acetic acid will do much to put acetate yarn in a stronger position and to aggravate the competition.

Consumption Trends

The growth of rayon was first the result of increasing consumption in the knit goods field, much of this growth representing the displacement of cotton underwear and hosiery. The next significant trend has been in the field of woven fabrics which comprise the so-called "style" or "quality" materials. Styling means constant replacements through rapid obsolescence of wearing apparel due to changes in taste. As Shakespeare has said, "The fashion doth wear out more apparel than the man". While knit goods accounted for most of rayon usage in the earlier years, it is now woven goods which



Courtesy "Rayon Organon"

Principal Chemicals Used in Synthetic Yarn Manufacture

Acetic anhydride	Delustering agents
Acetone	Dyes
Acid acetic	Ether
Acid hydrochloric	Finishing agents
Alcohol	Glucose
Ammonia	Hydrogen peroxide
Carbon bisulfide	Sodium nitrate
Caustic soda	Sodium sulfide
Copper sulfate	Sodium hypochlorite
Cotton linters	Wood pulp

are predominant and which are taking a steadily increasing percentage of total rayon shipments. As this trend continues, the demand for dull luster yarns will increase, as shiny wearing apparel is rarely in vogue. Noteworthy in connection with this trend is the fact that the past year witnessed the signing of every major producer under the Singmaster patents covering the production of dull rayon by the use of pigments.

Another favorable portent for the future is the rising trend in spun rayon consumption. Spun rayon, or rayon staple fiber, is rayon yarn cut off into short fibers several inches long, can be thrown into yarns just as natural fibers are spun, and produces a fuzzy material similar to cotton and wool. It has remarkable versatility, as it can be spun on cotton spindles and can be mixed with cotton or wool to give varied effects. Although it has existed for a considerable time, its possibilities have only been pushed within comparatively recent years. Domestic consumption of spun rayon in

1936 is placed at 25,400,000 pounds by *Rayon Organon*, a large gain over the 6,661,000 pounds consumed in 1935, which in itself was a record. A stimulus to further gains has been the price cut, in June 1936, to 28c per pound from 34c per pound.

Although the uses of rayon thus far have been largely in wearing apparel, other sources of demand are being actively developed. First came women's underwear and hosiery (as a large user of knitting yarn), suit linings, men's hosiery, etc. Then came household decorative applications—upholstery in furniture, drapes, bedspreads and curtains. For some time the industry has been concentrating its efforts on industrial applications, of which the tire fabric field is probably the most interesting. Since in the neighborhood of 200,000,000 pounds of tire fabric are used annually in the United States, rayon producers are quite secretive regarding the plans by which this dazzling prize will be won.

International Aspects Reviewed

One of the most impressive things about the rayon industry is that the steady growth in consumption is so general throughout various countries of the world. World production of yarn hit an estimated billion pounds last year, reflecting notable increases among a number of nations. This indicates (1) the world wide acceptance of the product, especially by countries whose purchasing power is materially lower than our own, (2) improved technology abroad, and (3) attempts to develop home industries. As a matter of fact, Japanese yarn production in 1936 approximated our own, whereas Japan's output of spun rayon was materially greater. Thus did the East wrest the leading position from the United States. A low labor factor and a depreciated yen, the national currency, were strong contributing factors to the betterment.

Not only are some foreign producers now on a self-sufficient basis but are able to export. This situation could, in time, be the cause of some unsettlement, because the home industries in many countries now are fully matured and are no longer to be considered as infants. As a consequence, time may show that more tariff protection is needed, or some international trade agreements established. In 1936 more than half of our estimated staple fiber requirements were imported, chiefly from Japan and Italy.

As the rayon industry is in strong hands technically and financially, it should continue to make progress. Gradual betterments made in the past and still continuing indicate that leaders are not being lulled into a false sense of security. The rayon industry should retain its old customers on merit and will cut into other products, but on a more keenly competitive basis than heretofore. An advantage for rayon here is the fact that the natural fibers have recovered pricewise far more than rayon. Over a period of future years, the volume may be expected to show moderate gains, with normal rest periods probably more freely interspersed than in the past. Keen competition will probably keep prices low, despite upward readjustments due to higher wages. The prevalence of low prices, however, as is true with many chemicals, seems economically sound, as it will encourage the development of further uses.

At the present time the main problem of the industry is adequate capacity. The current demand for the product is completely taxing present facilities, with the result that inventories are ridiculously low. The lack of production facilities is being corrected. It is estimated that present expansion plans will bring the annual capacity to over 400,000,000 pounds by 1938. Perhaps the plans attracting most attention are those of Industrial Rayon Corporation, which is building a plant said to incorporate a new, continuous and presumably low cost process. Not since the Furness process, has the industry had a method which gave promise of being revolutionary, and there is some belief that the new Industrial process is an adaption of the Furness method.

Chemical research will continue to be more actively pursued than ever before. There is still a great incentive to (1) improve processes, (2) develop labor saving machinery, and (3) increase recoveries. Wage rates are definitely on the uptrend and commodity prices are increasing. Many dye problems still exist. Possibly there is more to know of pigmented yarns. Production of pulp from southern slash pine may well mean a cheap future source of raw material for the industry. Thus, countless opportunities for improvement unfold themselves.

Success of rayon has encouraged the activities of other fiber manufacturers. Spun glass, known for years, is again attracting attention. Its chemical stability is a decided asset for industrial uses but, to be employed in wearing apparel, it would find obstacles in the way of coloring. Casein, synthetic woolen and linen fibers, are currently being developed. It is, therefore, readily apparent that the field for synthetic fibers, actively developed by rayon, is intriguing other products, but these products have a considerable distance to go to emulate the dynamic progress shown by rayon.

New Developments in Laundering

Recent developments in the laundering of textiles which are not yet generally accepted, but which show definite promise, are:

(1) The use of complex metaphosphates to dissolve accumulations of hard soaps.

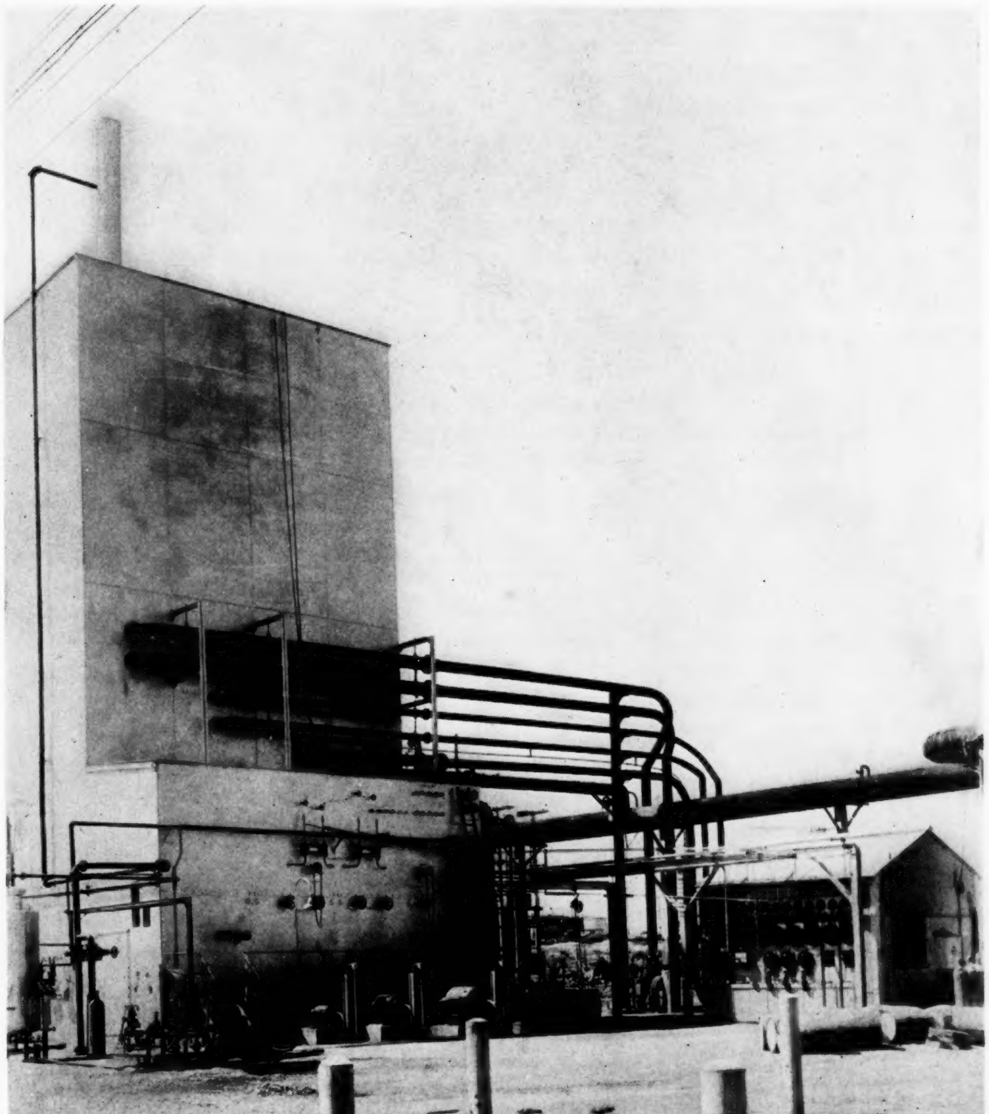
(2) The use of persulfates and hydrogen peroxide instead of hypochlorites in the bleaching operation.

(3) The use of coagulation inhibitors to permit the removal of albumins at a higher temperature with increased efficiency.

(4) The use of 'wetting out agents' such as the pine oil alcohols to increase the speed and efficiency of the penetration of the textile by the detergent.

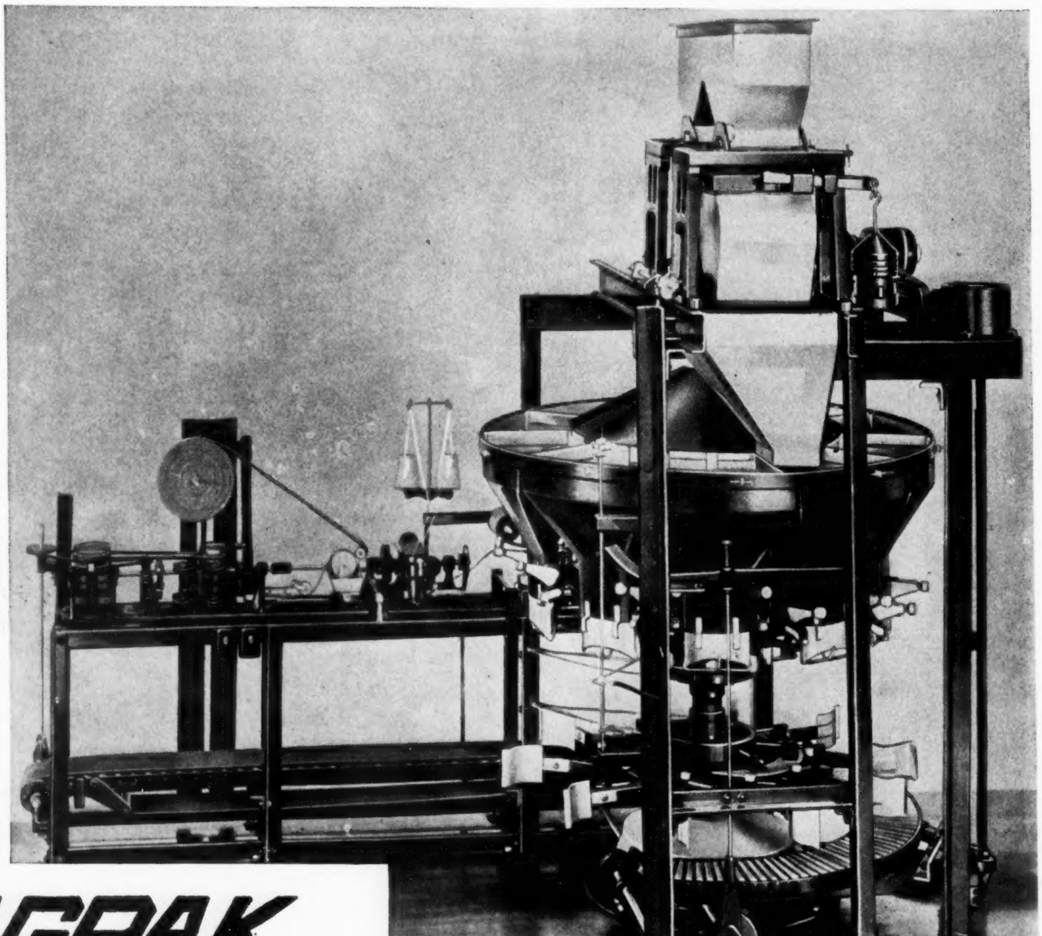
(5) The use of the alkali metal salts of certain long chain alkyl sulfonic acids and alkali metal salts of long chain alcohol sulfuric acid. These detergents may be used in the presence of salt and at pH's around neutral. This diminishes the leaching out of dyestuffs and preserves the color of fabrics through more cycles of laundering. "The Washing of Textiles," by Robert S. Shane, *Journal of Chemical Education*, p563.

Plant Operation and Administration



The first gas purification plant to use new patented Koppers phenolate process, erected at El Segundo, California, for Standard of California.

A Digest of New Methods and Equipment for Chemical Makers



Proper Construction of Chemical Plants and Equipment to Prevent Corrosion

By H. Seymour

THERE are several general principles which underlie all methods of corrosion prevention. The problems of the inside and out of a chemical works have little in common in corrosion prevention, for whereas the chemical engineer has a very wide selection for his indoor equipment, the structural engineer who houses this plant has a very narrow field from which to choose.

In building construction, the unfortunate situation exists that the only metal suitable for structural purposes is, from the corrosion standpoint, chiefly distinguished by the ease with which it is attacked, particularly by acids. When bare steel is used, this frequently introduces a serious problem, for in most chemical plants acid fumes of one kind or another are likely to be present occasionally, if not chronically. As there is no commercial method of rendering structural steel inherently acid-proof, about the only solution practicable is to keep the acid away from the steel. Even the relatively low concentration of acid in the furnace gases of locomotives has been known to stimulate corrosion in overhead girders to such an extent that it was necessary to concrete the structure to prevent failure. In general, this illustrates in principle about the only practicable method of corrosion prevention in buildings—if the material or materials of construction are attacked by any of the gases or liquids present, contact must be prevented. With steel buildings, the question usually resolves itself into the use of concrete, tile, brick, or paint, for protection of the walls, roof-trusses, etc. In any building of this type, the normal concentration of corrosive gases must be low, otherwise the building would be uninhabitable, so that the problem is in some respects simpler than the protection of apparatus.

Concrete, as well as most of the other structural materials used in conjunction with steel, possesses the disadvantage of being somewhat porous, so that corrosive gases and liquids can penetrate to the embedded steel. In such a case, the expansion of the steel due to the formation of more bulky corrosion products may crack the concrete or other surrounding medium. In order to alleviate this condition, the steel is sometimes covered with a layer of neat cement, thus maintaining an alkaline condition in the immediate neighborhood of the steel. Effective ventilation in a building, by diluting the gases, would minimize this effect, and would also improve general working conditions. Where embedding in tile, concrete, brick or other non-metallic materials is not practicable, the only recourse is through pointing and periodic inspection. For exposure to acid fumes, non-metallic materials, such as tile, brick, and concrete, are in general more suitable than steel, as being less affected by a low concentration of acid fumes. Certain special steels, notably the copper-bearing ones, have shown their value under these conditions also.

The floors of buildings in which corrosive materials are handled present a problem in themselves, as floors are not only exposed to corrosive gases, but also, on account of spills, leaks, etc., to any concentration of almost any corrosive substance. To prevent destructive action by these materials, there are two obvious remedies; the floor may be covered with an impervious, unattackable material, or provision may be made for removing corrosive material immediately. The best method would make use of impervious unattackable flooring material, and provide ample facilities for washing down rapidly when any spill or leak ocurs. In such a case, ample floor drains properly placed, should be provided, with means for obtaining a large supply of water. The choice of flooring must depend on the nature of the materials being handled. Steel or concrete would be satisfactory for caustic, and mastic or acid-proof brick for acids.

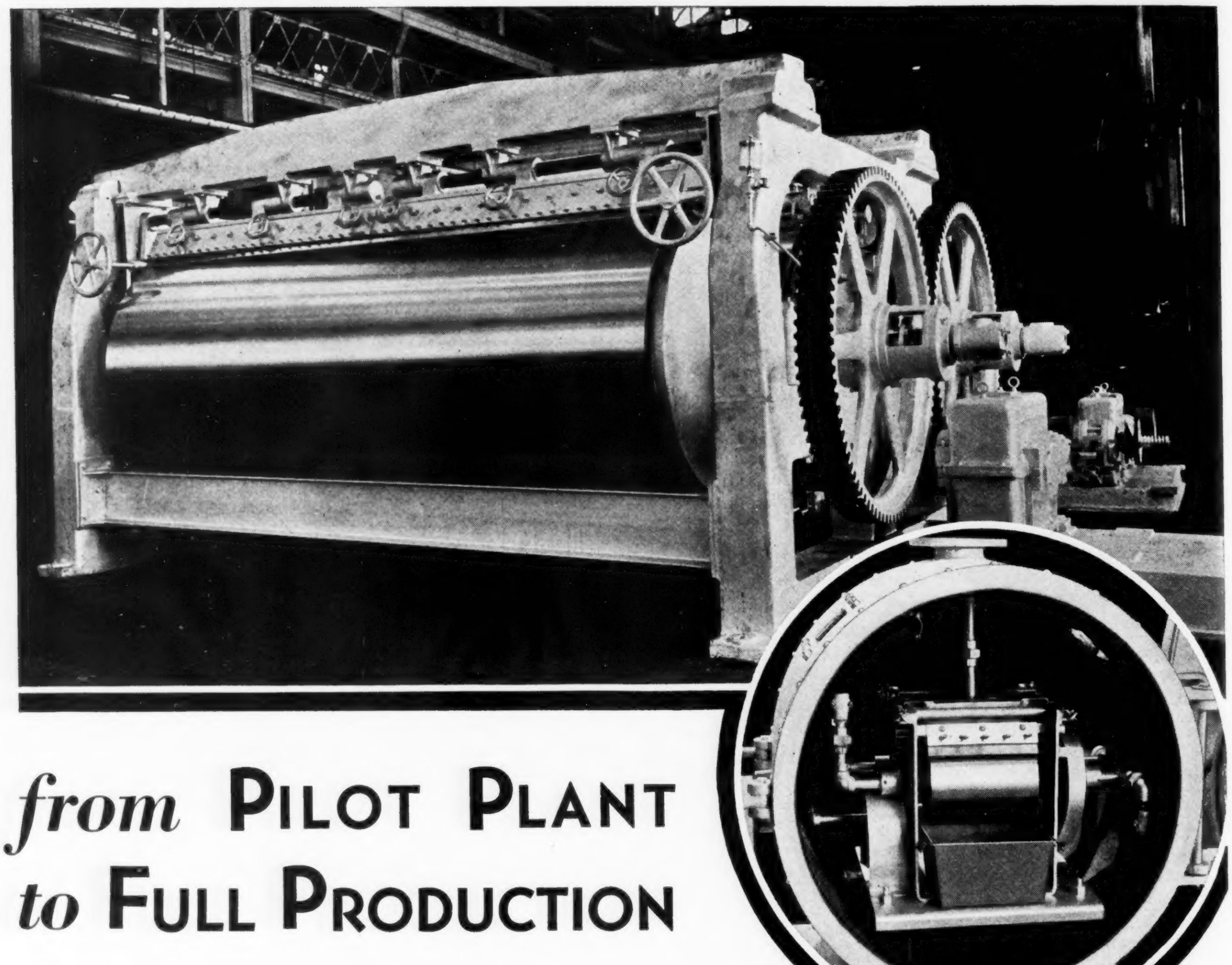
Outside steel equipment, such as storage tanks, which may be exposed to acid fumes and are thus subject to accelerated rusting, may generally be best protected by painting, preferably with a paint of the asphaltic type, or aluminium, though cement coating has been used with success for this class of work.

The danger element from apparatus is generally due to the mechanical failure of some portion, consequent upon its weakening by corrosion. The obvious and perfect remedy for this is to select materials for apparatus construction which are not attacked by the materials being handled, but this is more easily said than done. Each new reaction is a problem in itself, and the selection of the proper material may involve considerable research. This is true to such an extent that some perfectly feasible reactions have never been commercially developed on account of the impossibility of finding equipment in which to carry them out. An example of this is the process for recovering as hydrochloric acid the chlorine of the Solvay process; the process, however, requires fusing anhydrous phosphoric acid, a treatment which no known material will withstand.

In selecting a suitable material for apparatus construction, the first difficulty encountered is the very limited field from which the choice must be made. If only resistance to corrosion were required the choice would be simple; selection is complicated by the fact that the material must also have suitable mechanical or physical properties. Still more unfortunately, the materials of suitable physical properties are very likely to be entirely unsuitable chemically, and *vice versa*. From the point of view of strength, the ease of working, and other mechanical properties, the ordinary ferrous metals leave little to be desired, but, unfortunately, they are readily attacked by acids, and, if alloyed so as to increase their acid resistance, they often become either unsuitable physically for structural work, or highly expensive. Since the average life of chemical apparatus is rather short, it must be constructed of relatively cheap material. In calculating this cost it should be figured as added to the price per pound of the material produced in the given piece of equipment during its useful life, otherwise the results may be distinctly misleading.

On account of the chemical unsuitability of many of the materials possessing suitable mechanical properties, and *vice versa*, the chemical engineer is frequently forced to the experiment of combining two materials in such a way that one supplies the mechanical strength, the other the resistance to corrosion. Although this type of construction is quite common, as evidenced by the use of a large number of lined vessels (lead-lined, enamelled, tile-lined, copper-lined silver-plated, etc.), it is, strictly speaking, a subterfuge to evade the difficulty of no one suitable material existing. Often, since a lined vessel of any sort really consists of two vessels, one within the other, the probability of faults of some sorts is multiplied by two. Since the material furnishing the mechanical strength in this type of construction is usually readily attacked by the material being handled, a spill or a pinhole in the lining may also cause extensive or rapid destruction of the stronger metal. For this reason, the lined type of construction, although frequently used, cannot be considered a final solution.

The first line of defence in constructing apparatus for handling dangerous material is to select a structural material as far as possible unattacked under the conditions. However, since there is a possibility of ultimate failure—either in whole or in part—if there is any corrosion some provision must be made so that this failure will not endanger the operators. The nature of the provision to be made and precautions to be taken



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depends, of course, on the nature of the operation and material being handled. Briefly, the conditions to be taken into account are the physical condition of the vessel's content (solid, liquid or gas), the nature of the risk therefrom (whether due to the inflammability, toxicity, or corrosiveness), and the temperature. The general principle to be borne in mind in safeguarding such equipment is that, when the escape of material takes place, contact with the operator must be prevented. The provision for accomplishing this mechanically depends on the nature of the reaction vessel, which may operate at atmospheric or elevated pressure, handling solids, liquids, or gases, either inflammable or non-inflammable.

Explosion or fire danger from the accidental escape of flammable material can obviously be avoided by having present nothing capable of igniting the mixture. This would require vapor-proof globes to be used, static to be eliminated by suitable grounds, open flames forbidden, etc. It should be borne in mind that many substances can be ignited without contact with a flame, the temperature of spontaneous (and instantaneous) ignition being sometimes as low as 150° C., so that steam pipes, or the friction of a gas passing through a pipe at high velocity, may serve to ignite the gas; also that a current of flammable gas may drift a considerable distance in dangerous concentration, so that all possible ignition sources must be removed to a safe distance or provision must be made by suitable ventilation for the immediate dilution of the flammable gas below the explosive concentration.

When Working with High Pressures

With the fire or explosion risk properly safeguarded against, the remaining precautions necessary can be largely confined to the neighborhood of the reaction vessel. Obviously, the fundamental difference between apparatus working under ordinary pressure and that working under raised pressure is that, in the case of a leak, the contents of the latter escape more rapidly, and an explosion is possible in which the vessel itself may become the danger element. Taking the explosion risk first, the obvious way to prevent explosive failure, due to weakening of the entire vessel by corrosion, is frequent inspection to ensure that the material retains its original thickness and structure. This last is important, as in many cases metals may suffer heavy corrosion, with serious loss of strength, without change in dimensions; brass, for instance, may become, through de-zincification, a loose porous mass of spongy copper, cast iron a graphite-like body, etc. The inspection should therefore be thorough, so that it will be certain not only that the thickness is still sufficient, but also that the metal still possesses the necessary physical characteristics. The method of inspection, of course, will vary with the equipment. Test holes may be drilled, and later welded or otherwise plugged, the thickness measured directly; in some cases X-ray photographs can be taken. Periodic hydrostatic tests should also be applied, at a pressure of at least 50% above the working pressure being used.

In all vessels handling corrosive material, the principle to be observed is to remove such material to a safe place, or render it harmless, without permitting it to come in contact with the operators. In the case of vessels handling solids the problem is relatively simple, as solids do not leak readily and are relatively non-corrosive, so that the problem is really one of preventing dust poisoning or ignition. In the case of vessels containing liquids, the apparatus should be installed in a casing of light sheet steel on suitable material, either tight at the bottom and capable of holding a charge, or drained to a suitable receiver. This arrangement can frequently be made at slight additional cost, if borne in mind in the original design. Caustic firepots, for instance, are commonly placed above settings capable of holding a charge of caustic. Autoclaves should be cased, so that in the event of a leak the material will be prevented by the case from being forced directly out into the operating space The casing should extend down to a floor, so that no one can walk under the apparatus, and if the material gives off poisonous vapors, the casing should be ventilated thoroughly.

For vessels employed in handling toxic or corrosive gases, the usual method is to provide means of removing the gas and diluting it below the danger point before discharging into the air. The degree of thoroughness of removal and extent of dilution necessary depends on the nature of the toxic substance. Some, like cyanogen chloride, produce such unpleasant symptoms in less than lethal concentration; others produce little or no effect till a dangerous concentration is reached. Each gas is really a problem in itself, but the general principle of rendering the escaping gas harmless by dilution is the most practical to use in the majority of cases.

Safety Devices for Corrosive Chemicals

Where safety devices are used in connection with corrosive chemicals, the behavior of these under the working conditions becomes very important. Safety valves may be stuck down by cement-like corrosion products, vent lines may be completely stopped in the same way. In one recorded case, a fusible plug in a boiler, intended to prevent overheating, was rendered infusible by corrosion, a boiler explosion resulting. Safety discs are more dependable than safety valves, as corrosion usually weakens the disc and thereby increases the factor of safety on the autoclave. Also, on account of the small weight of metal in a safety disc, expensive metals can be employed if more suitable from either the chemical or mechanical point of view.

In the actual design of the apparatus, the working conditions must control the design, so that general rules could hardly be laid down. A few points, sometimes ignored, might be mentioned. It is well recognized that galvanic couples or combinations of dissimilar metals should not be used in an electrolyte. It has frequently been overlooked, however, that a rivet or staybolt in a plate may constitute such a couple, due to the working of the metal of the rivet or bolt, or the inclusion of oxide in the joint.

Since corrosion takes place faster at an angle or intersection of two planes, sharp corners of any sort should be avoided in apparatus subject to such action; also, sharp corners and crevices are difficult to clean, and consequently present a hazard in making repairs. Corrosion is stimulated by velocity, particularly when turbulent, so many parts subject to the action of liquid in turbulent flow should be made easily replaceable or extra heavy, or both. Another reason for simplicity in design is to facilitate repairs. It should not be necessary to enter the vessel to make repairs. The vessel should also be of such simple inside design that it can be thoroughly cleaned from the outside before being entered. British, *The Chemical Age*, Nov. 28, '36, p457.

Acetylene from Coal and Oil

Acetylene is obtained by feeding a finely comminuted, normally solid carbonaceous material and a normally fluid hydrocarbon material simultaneously to an electric arc. Carbonaceous material must have an atomic H : C ratio below 0.75, and may be soft or hard coal, coke, charcoal or lamp black. Hydrocarbon material may be methane, natural gas, petroleum refinery gases, ethane, butane, ethylene, butylene, naphtha, gas oil, or tar. Patented process of Standard Oil Development.

Tartaric Acid from Grapevine Leaves

The Transcaucasian Institute of Viticulture, Kakhetya, the Caucasus, is reported to have developed a process for producing tartaric acid from the leaves and sprouts of the grapevine.

Recovery of Potash from Molasses

Processes permitting the recovery of potash from molasses without affecting its yield in alcohol have been developed by a professor of the Tokyo Imperial University, according to reports from Tokyo to the Chemical Division, U. S. Dept. of Commerce.

Concentrated Phosphoric Acid by the Wet Method

A SWEDISH company, the A-B Kemiska Patenter, located in Landskrona has developed a new process for the production of phosphoric acid which permits direct production from phosphate rock and sulfuric acid, with a content of from 23% to over 30% of P_2O_5.

The calcium sulfate formed can be obtained in various hydrated forms such as $CaSO_4$, $2H_2O$, $CaSO_4.\frac{1}{2}H_2O$ and also anhydrous as $CaSO_4$ by regulation of the temperature and the acid concentration during the reaction. If it is desired to obtain phosphoric acid of high concentration, it is preferable to allow the calcium sulfate to deposit as hemi-hydrate or anhydrite.

All the hitherto known and described technical methods, which concern the direct production of phosphoric acid with the formation of calcium sulfate as the di-hydrate, and the separation and washing out of the latter by filtration and displacement have the disadvantage that very large quantities of phosphoric acid or of reaction slurry must circulate. If it was desired to obtain higher concentrations than acid containing 20—22% P_2O_5, it was necessary either to carry out the reaction in several stages, or to connect a number of filter apparatus in series, and between each of these filter installations to mash up the calcium sulfate again in separate mixing vessels with solutions, the P_2O_5 content of which was gradually reduced.

Extensive experiments have led to the surprising discovery that it is quite unnecessary to allow any large quantities of phosphoric acid to circulate during the reaction process, and that it is possible to produce phosphoric acid with about 28—30% of P_2O_5 in a manner suitable for operation on a technical scale even when using the reaction process leading to the precipitation of calcium sulfate di-hydrate.

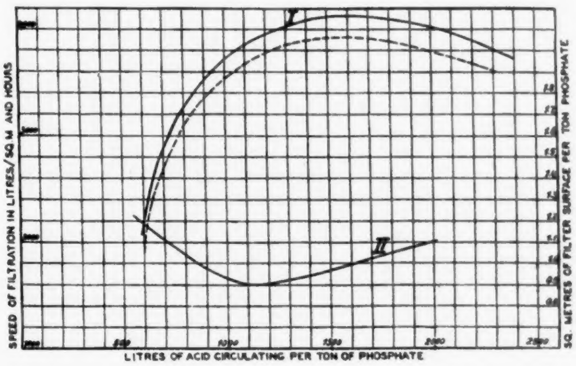
The new process is characterized in that the quantity of phosphoric acid introduced into circulation during the reaction is not greater than 2 liters, preferably 1 to 1.2 liters per kilog of phosphate reacted, the recirculated phosphoric acid being the only phosphoric acid employed in the reaction, and in that the separation and washing of the calcium sulfate di-hydrate formed takes place in a single filter apparatus, preferably on a circulating belt filter, in which the elastic carrier band is passed over the smooth and even edges of one or more suction boxes to which it adheres closely, situated under the upper travelling carrier belt, so that their aperture or apertures are only covered by a fraction of the width of the carrier belt.

Fig. 1 shows graphically the relation between (1) the quantity of phosphoric acid circulating during the reaction; (2) the speed of filtration, and (3) the area of the filter required per ton of phosphate.

The curve I in Fig. 1 shows, that for example when phosphoric acid of 31—32% by weight of P_2O_5 is produced, the maximum speed of filtration is attained if, to 1 kilog of the phosphates being worked up, 1.5—2 liters of phosphoric acid are allowed to circulate during the process. It can be seen that the quality of the di-hydrate crystals and the filtration properties thereof very quickly improve as the quantity of circulating phosphoric acid increases from, for example, 0.6 liter to 1 liter per kilog of phosphate. If a still larger quantity is used, then the speed of filtration improves until it reaches a maximum between 1.5 and 2 liters of circulating acid per 1 kilog of phosphate. If the quantities are increased further the speed of filtration slowly diminishes.

The filtration properties of the resulting calcium sulfate are of especial importance when dealing with the filtration of phosphoric acid sludge on a technical scale. Filtration speed alone is not decisive, but the proportion between the amounts of liquid to be filtered per unit of product and the speed of filtration.

The proportion between the value of these quantities and the speed of filtration gives a quotient which is a standard measurement for the size of the filter surface that is required for each unit of phosphate to be processed, for example, 1 ton. These values are calculated for the case of pebble phosphate and are shown in curve II of Fig. 1 in relation to the amount of circulating acid. This curve has the same abscissa as curve I, but another ordinate (on the right hand side of the graph), namely, the number of square meters which are necessary in order to produce the amount of phosphoric acid per hour which corresponds to one ton of raw phosphate. From this curve it can be seen that the smallest filter surface is required if the proportion of circulating phosphoric acid to decomposed phosphate is about 1.2 liters to 1 kilog.



From the two curves I and II (Fig. 1) it follows, therefore, that between the limits of O to about 2 liters of circulating acid per kilog of phosphate not only is the best filtration of the precipitating calcium sulfate obtained, but also within these limits the highest filtering effect is produced.

When operating the present process it is important that the calcium sulfate precipitates as pure di-hydrate. It has been found that especially pure di-hydrate is formed if the reaction is started with less than the total amount of sulfuric acid required.

The following example illustrates how the process of the invention may be carried into effect: 1,000 kilogs of pebble phosphate are mixed with 1,000 liters of phosphoric acid with a content of 17.5% of P_2O_5 and a temperature of about 30° C. This mixture is introduced into an agitator, together with 500 liters of sulfuric acid of 60° Bé. When the total amount is poured in a further 150 liters of sulfuric acid are added after some time. The temperature rises, due to the heat of reaction, to 70—80° C. It remains within these limits until the reaction is complete, about 4 hours.

The reaction slurry is now filtered on a belt filter. In order to wash the filter cake 1,000 liters of wash acid with a content of about 4% of P_2O_5, followed by 1,200 liters of water, are used. As filtrate there are obtained: 850 liters of product with 30.2% P_2O_5, specific gravity 1.36; 1,000 liters of circulating phosphoric acid with 17.5% P_2O_5; and 1,000 liters of washing acid with about 4% P_2O_5. The average speed of filtration was 3,450 liters per square meter per hour, and the speed of filtration when washing with water was 3,650 liters per square meter per hour. Total yield was 95.2%. The process described can also be carried out in a continuous manner. Process is covered by patents and this report was digested from British, *The Chemical Trade Journal*. Jan., '37, p5.

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New Koppers Phenolate Process Described

The first plant in the east which will purify refinery gas by the new Koppers phenolate process, is to be erected soon for Atlantic Refining at its Philadelphia refinery, by the Engineering and Construction Division of Koppers. A similar plant, the first to use this patented process, was erected by Koppers at El Segundo, near Los Angeles, Calif., for Standard Oil of California, and was put into operation Aug. 6, '36.

By this process the gas is prepared for treatment in a polymerization unit for production of liquid hydrocarbons, it being purified to the extent of 95 to 99.8%.

Plant to be built for Atlantic Refining will be able to recover the hydrogen sulfide from 22,000,000 cu. ft. a day of refinery still gases at 225 lbs. pressure. The hydrogen sulfide may be converted to sulfuric acid and the purified still gas will be further processed by polymerization.

The purification system consists of an absorption stage and an actification stage, through which the phenolate solution is circulated continuously. This solution has an extremely high carrying capacity for hydrogen-sulfide, amounting to 2000 to 4000 grains per gal. As a result it is necessary to circulate only 5 to 10 gallons of solution per thousand cu. ft. of sour gas. This very low circulation rate is one of the reasons for the low operating expense and the simplicity of equipment required in comparison to other liquid purification processes.

The hydrogen-sulfide laden gas enters the absorber at the base, passes up through the bubble-cap trays and leaves at the top, stripped of 95% of its hydrogen-sulfide. The solution leaving the bottom of the absorber, saturated with hydrogen-sulfide with respect to the incoming gas, passes through the heat-exchanger tubes to the top tray of the actifier. It flows down over the actifier trays, counter-currently to the stripping steam which is generated in the reboiler at the base. Sufficient indirect steam is used to effect the desired degree of actification of the solution. This, in turn, is determined by the maximum residual hydrogen-sulfide desired in the exit gas.

The actified solution flows from the reboiler through the heat-exchanger shell, is further cooled in the solution cooler, and is then pumped to the 4th tray below the top of the absorber. The absorption cycle starts again at this point.

Hydrogen-sulfide laden steam passes from the top of the actifier to the dephlegmator shell and thence the hydrogen-sulfide is forced, by the actifier pressure, to the acid plant burner or other point of disposal. Condensate from the dephlegmator returns to the actifying column.

Fresh water is added continuously to the top tray of the absorber. The 3 top trays comprise, in effect, a water scrubber to recover chemicals which have been entrained or evaporated from the solution. It is necessary, at periods of several days, to replenish chemicals lost from the system, and a small mixing tank is provided for this purpose. The caustic soda and crude phenol used in the process are inexpensive. This system, it is claimed, is completely adaptable to conditions peculiar to individual projects.

Improved Lead Pipe and Sheet Lead for Equipment

Under the direction of Alfred P. Knapp, treasurer, and Robert T. Jaeger, chief engineer, workmen of the Andrews Lead Co., 30-48 Greenpoint ave., Long Island City, N. Y., gave a demonstration on Dec. 18th before 200 guests of two revolutionary patented methods for the production of lead pipe and sheet lead. It was stated that for nearly 100 years there have been attempts to perfect and apply the core and bridge type of extrusion apparatus to lead pipe. By the development of special dies and cores, built on this principle, a new equipment has been perfected which is claimed to eliminate most, if not all, of the defects incident to the older or conventional process. A much smaller die, core and ram is used which of course naturally requires much greater pressure to operate but which, it is said, produces a product which is guaranteed free from scoring, laminations, and other defects. Pipe produced by this new method and apparatus is beautiful in finish, accurate in wall thickness to 0.001-inch and has an inside finish resembling a finished gun barrel. What this offers the chemical engineer in processes where lead pipe is employed is perfectly obvious. Instead of a comparatively rough inner surface a smooth bore is now possible.

Sponginess is entirely eliminated so that it is unnecessary to cut off the first 5 or 6 feet of the extruded pipe. Laminations are entirely absent, it is claimed. Another advantage claimed is the lead in the finished product is more compressed and has a tighter grain structure. If tellurium bearing lead is used, a lead containing less than 0.10% tellurium which work hardens when processed, the resulting product is said to be 40% stronger by the new process than by the older one.

In opening up the discussion of the new process for making sheet lead, it was pointed out by Mr. Knapp that ordinary sheet lead is soft and workable, but it has the disadvantage that it has not strength to support itself—when installed in certain equipment, it buckles or creeps.

Some 20 years ago, to overcome this defect and others, producers of sheet lead took plain sheet lead and rolled into it at certain intervals bars of antimonial lead or lead containing 6 to 7% of antimony. This method strengthened the large sheets to some extent and improved the product. But this was not entirely satisfactory.

Anxious to still further better the product, the Andrews company after some years of experimentation and research, has perfected a new process which was described briefly as follows:

The lead before rolling into sheets is coated with a layer of antimonial lead, that is, it is clad with this alloy lead. When this is rolled out into sheets, the product has one face or side of pure lead and the other face or side coated with antimonial lead. In this manner the entire surface is strengthened. It is possible also to produce a sheet which has a lead facing on both sides with this antimonial lead inside. It was pointed out that lead sheets thus made are much stronger and stiffer than sheets of pure lead and hence available for many types of construction, which pure lead is not adapted to.

Revolutionary Type of Steam Plant

The I.G. has just completed at its Leverkusen works a new type of steam plant which will produce electricity at 0.1d. per kilowatt-hour. This plant, rated at 250,000 h.p., is said to be the only one of its kind in the world. It has a vertical boiler with tubes between 75 ft. and 100 ft. long. Principal feature of the plant is that there is no water in the firebox. The tubes, instead of water, contain steam, which is drawn off the head of the tubes at 1,000 lb. The boiler burns powdered coal at 500° C., working pressure 135 atmospheres. It is equipped with Cottrell precipitators and has no smokestacks. There is no fly ash, and it gives off no combustible matter. British, *The Chemical Trade Journal.*

Combustible Gases for Automotive Fuel

Announcement is made of recent patent application No. 436,393 filed by Halley T. Gaetz on Dec. 1, '36, with the Patent Office of Canada, involving the use as fuel for automotive internal combustion engines, specified mixtures or blends of certain commercially available combustible gases. In particular is stressed the explosion together in the cylinder of "gaseous"

hydrogen and oxygen. It is noteworthy that the raw materials from which the above two gases may be prepared commercially in quantity, namely, ordinary water and air, are likewise practically unlimited in quantity. Either gaseous or liquefied oxygen (or liquid air) is prepared by liquid air plants, and both it and hydrogen may be prepared from the electrolysis of water or the dissociation of water over iron at elevated temperatures, as well as hydrogen and other gases from the cracking of petroleum substances.

Practical application of the process holds largely, it appears at present, in instances where gasoline and related fuels are not readily available, where the depletion of available gasoline supplies is soon apparently inevitable, and where it may be deemed best to conserve to some extent limited reserves of crude petroleum and related substances for the purpose of deriving myriads of petroleum products.

Butyl Alcohol and Acetone from Molasses

Details of the method for the production of butanol and acetone from molasses, developed by Rafael Arroyo, of Puerto Rico, are given in the English Patent specification 453,524 of 1935. A new organism has been isolated from the nodes of Kassoer cane, and is now called *Bacillus tetryl*. It is characterized by its ability to ferment invert sugar with the formation of butanol and of acetone with a low proportion of ethyl alcohol. It is incapable of fermenting sucrose, and is acclimatable to densities in excess of 12° Brix.

In a proposed method, a solution of cane molasses containing 40 to 60 grams of total sugars per liter is inverted with sulfuric, neutralized with calcium carbonate, and sterilized. Its pH should be about 6.0. This prepared mash, to which has been added 1 to 5 grams per liter of so-called "activators," such as a mixture of kieselguhr and lampblack, is seeded with *B. tetryl*, and allowed to ferment at a temperature from 32° to 37° C., preferably around 35° C. for about 48 hours. Under such conditions the yield of solvents from one gallon of molasses has been found to be: Butanol, 1.95 lb.; acetone, 0.40 lb.; and ethanol, 0.10 lb.

Acrylic Acid from Ethylene Cyanhydrin

Acrylic acid is manufactured by hydrolyzing ethylene cyanhydrin with sulfuric acid diluted with water. The reaction may be effected by distilling the mixture of the cyanhydrin and acid, preferably with the passage of carbon dioxide through or over the liquid, which passage may be commenced as soon as acrylic acid commences to distill over or prior to heating. Further ethylene cyanhydrin may be added at approximately the rate at which the acrylic acid distills over. In an example, ethylene cyanhydrin is distilled with 3 times its volume of a dilute sulfuric acid obtained by diluting 98% sulfuric with one-fifth its volume of water. The crude distillate is purified by distillation at 20 mm. pressure in an inert atmosphere, for example, carbon dioxide, or by allowing crystals of acrylic acid to deposit from the liquid. English Patent, 455,087, Triplex Safety Glass, London.

New Light on Filtration Problems

A little understood factor and, it appears, rather a weighty one under certain circumstances, is now shown by W. Mehner, of the Institut für Apparatebau of the Technische Hochschule at Karlsruhe, to be the presence of dissolved gases in the liquid passing through the filter. Several investigators who have studied the filtration of liquids, free from suspended particles, through porous media have been impressed by the frequent departure of the process from the course anticipated from the application of the Poiseuille Law, according to which the speed of filtration is directly dependent upon the difference of pressure obtaining between the two sides of the filtrating surface. British, *The Chemical Trade Journal* (edit.) Jan. 15th.

Concentrated Acid In Superphosphate Production

The opinion hitherto held in the superphosphate producing field has been that acid cannot be advantageously used at a concentration higher than 54 to 55° to 55° Bé., that is, containing from 68.5 to 70% H_2SO_4.

One of the former objections to the use of higher-strength acids resided in the fact that many superphosphate manufacturers produce their own sulfuric acid in chamber plants, but the modernization of such plants has now meant the general availability of acid of strengths up to 60° Bé. A second drawback existing until recently to the employment of more concentrated acid, lay in the fact that when making superphosphate by the ordinary process, if the concentration of the acid used exceeded a certain limit (varying with the nature of the phosphate rock used), the decomposition of the phosphate rock was not satisfactory. The higher-strength acid does not completely attack the phosphate, the superphosphate obtained being sticky, very acid and of insufficient soluble phosphoric acid content. With some phosphate rocks, particularly with certain North African rocks, it is possible to use acid of 56° Bé. by the usual method; but even so, there is a certain risk in the process.

A two-stage method of superphosphate production to remedy this drawback has now been developed by M. Sven Nordengren (patent of the A.B. Kemiska Patenter of Landskrona). In this method the sulfuric is not mixed with the total quantity of phosphate needed. Part only of the latter is added to the acid during the first stage with the object, mainly, of reducing the concentration of the sulfuric by its dilution with the phosphoric acid formed. The quantity of phosphate rock attacked during this first stage should not exceed two-thirds of the total quantity to be used. A highly important point is that the formation of mono-calcium phosphate should be rigorously avoided during this first stage, otherwise the thickening of the mass would be too pronounced. The mono-calcium phosphate is only formed in the second stage of the process.

In practice, the use of two-thirds of the total quantity of rock in the first stage is not always possible, since the mass would become too pasty and would offer great difficulties to stirring. In the operation of the process, less than two-thirds of the total quantity of phosphate are attacked in the first stage, the actual quantity being so chosen that a fairly fluid paste consisting of phosphoric acid, sulfuric acid, calcium sulfate, and unattacked crude phosphate is produced. The more liquid this paste, the more rapidly and the more completely is the phosphate rock decomposed. The reaction usually goes to between 80 and 90% of completion in 5 to 10 minutes.

The mixture resulting from the first stage reacts very rapidly and very intensively on the balance of the phosphate in the second stage, the product from this second stage being either semi-liquid or plastic, according to the duration of mixing. The final mixing is, as usual, left for a certain time in a chamber to allow setting to take place. The time necessary for this process depends in large measure on the nature of the phosphate, and ranges from about 20 minutes in the case of some African phosphates and about 120 minutes in the case of Florida hard rock. By using these methods, sulfuric of concentration up to 60° Bé. can be used. It is even possible to utilize acid of higher concentrations still, such as that made by the contact process. In these latter cases, certain modifications are necessary, but the patent position does not as yet allow detailed description of these modifications.

On the technical scale, Dr. Lehrecke, reports the two-stage process had been found simple. The process is adaptable both to continuous and intermittent operation, and can be carried out on any of the more modern types of superphosphate equipment such as the Broadfield, Moritz, Maxwell, etc. A continuous large-scale plant, designed at Landskrona, is already in successful operation at the factory of the Foerenade Superfosfatfabriker. The superphosphate produced has a loose and granular structure, rendering it exceptionally suitable for further drying, mixing, etc. A further advantage of the process is claimed to reside in the possibility of decomposing two different phosphates.

It is possible, for instance, to employ in the first stage a phosphate difficult to decompose, and in the second stage an easily decomposable phosphate.

From a mixture of 85% of hard rock and 15% of Curacao phosphate, with a dry weight content of 36.5% of P_2O_5, after conversion into superphosphate with 57° Bé. sulfuric, in quantity equivalent to 108 kilogs of 50° Bé. acid per 100 kilogs of rock, there was obtained on plant-scale working a superphosphate which after 28 days contained 20% of water soluble P_2O_5 4.40% of free acid, and 9.32% of moisture. Dr. L. H. Lehrecke, *L. Industrie Chimique*, December, '36.

Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

American Cyanamid Co., 30 Rockefeller Center, N. Y. City. American Hortigraphs and Agronomic Review for January-February is ready for distribution.

The Bakelite Corp., 247 Park ave., N. Y. City. The Bakelite Review for January is an attractive review of the latest accomplishments in the molding field.

The Celluloid Corp., 10 E. 40th st., N. Y. City. "Molding With Lumarith" is an illustrated booklet on this company's thermoplastic material.

City Chemical Corp., 132 W. 22nd st., N. Y. City. This supplier has just issued a catalog of 240 pages, a very comprehensive listing of chemicals with quotations.

Detergent Products Corp., Atlanta, Ga. This manufacturer of textile detergents has just issued a new booklet, "Theory of the Use of Alkalies and Control of pH Simplified for the Benefit of the Layman."

E. I. du Pont de Nemours & Co., R. & H. Chemicals Dept., Wilmington, Del. The latest quarterly price list (January) is available.

Foote Mineral Co., Philadelphia, Pa. The latest issue of Foote-Prints contains two exceptionally fine articles—"Fluxes, Their Function in Metallic Arc Welding," and "Zircon as a Ceramic Material."

Innis, Speiden & Co., 117 Liberty st., N. Y. City. You will enjoy Isco News and in addition will find a comprehensive list of the chemicals and raw materials made or marketed by this company.

Koppers Company, Pittsburgh, has issued a 16-page presentation, in Fortune style, on its coke, gas, tar, chemicals and other products.

Paul Lewis Laboratories, 918 N. 4th st., Milwaukee, Wisc. A new catalog of the biological and organic chemicals produced by this firm.

Mallinckrodt Chemical Works, St. Louis, Mo. The January price list.

Merck & Co., Rahway, N. J. The January price list.

Clarence Morgan, 919 N. Michigan ave., Chicago. A complete list of the chemicals distributed by this firm.

Prior Chemical Corp., 420 Lexington ave., N. Y. City. Priorities for February contains some very interesting and pertinent data on the tanning industry.

Equipment

Abbe Engineering Co., 50 Church st., N. Y. City. New leaflet describes the Abbe Blutergess Turbine Sifter. Well illustrated with photographs of actual installations.

Babcock & Wilcox, 85 Liberty st., N. Y. City. Describes the B & W direct-firing pulverized coal system.

Babcock & Wilcox. Tables of grindabilities and analyses of many of the coals mined in the U. S., Canada, and other countries are contained in a new 32-page bulletin.

Bailey Meter Co., 1050 Ivanhoe Road, Cleveland. Bulletin 163 describes the new Bailey Diaphragm-Operated Multi-Pointer Gage.

Bull & Roberts, 117 Liberty st., N. Y. City. An 8-page booklet, profusely illustrated is entitled, "Chemistry Serves the Shipping Industry."

The Chain Belt Co., Milwaukee, Wisc. This company has just released 3 new folders descriptive of Rex Roller Chain, Rex Griplock Chain, and Rex Z-Metal Chain.

Consolidated Air Conditioning Corp., 114 E. 32nd st., N. Y. City. "Consolidated Odor Absorbers in Air Conditioning" covers quite completely the question of cost of operating and air conditioning system.

The Foxboro Co., Foxboro, Mass. "Wet and Dry"—is a comprehensive 40-page bulletin discussing the instruments and application methods for humidity control in a wide range of industrial drying and processing operations.

The International Nickel Co., 67 Wall st., N. Y. City. "Nickel Cast Iron News" is an illustrated monthly which will attract the attention of the plant manager, construction engineer, consultant, etc.

Lewis-Shepard Co., 175 Walnut st., Watertown, Mass. A new, small, colored folder, No. 321, on materials handling equipment has just been issued. Illustrates equipment for handling barrels, drums, carboys, cartons, cases, etc.

The Linde Air Products Co., 205 E. 42nd st., N. Y. City. "The Oxygen Lance" is an 8-page booklet which describes exactly what the oxygen lance is, how it is used, and what it will do.

Stearns Magnetic Mfg. Co., Milwaukee, Wisc. Magnetic Hand Book is the title of a new loose-leaf manual, comprising 170 pages, 9 x 12-inch format, with rich fabricoid cover. This new book was compiled in answer to the demand for a standardized catalog containing technical data, illustrations and description of the various phases of magnetic engineering and is a comprehensive survey of the subject.

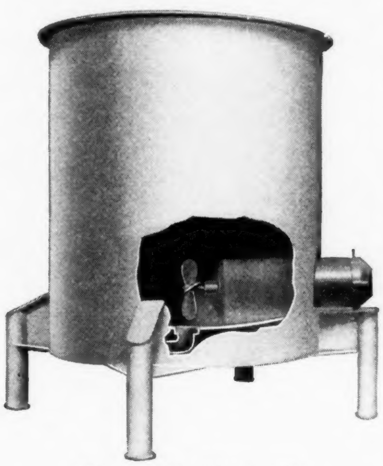
New England Tank & Tower Co., Everett, Mass. Bulletin 370 is a 76-page offset catalog showing company's complete line of agitating equipment. This catalog also contains a new Hand Book and Data Section beginning on page 56—which contains information never before printed.

New Equipment

Portable Mixing Unit

The "Lightnin" portable mixing unit, built by Mixing Equipment, Rochester, N. Y., was first developed for the paint industry.

The especially designed patented housing for the mixer introduces the agitator in an angular off-center position which results in a double mixing action . . . complete rotation plus bottom-to-top turnover. The mixer housing serves as a baffle which still further increases mixing efficiency. The built-in explosion resistant motor is approved by Underwriter's Laboratories.

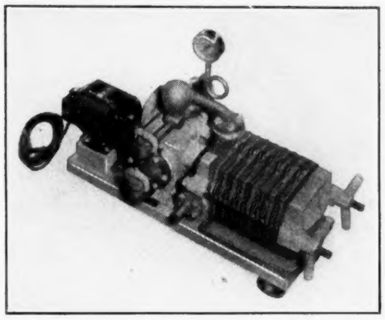


New portable mixing unit.

Portable either on truck or casters, the unit can easily be moved from one source of supply to another—eliminating needless piping. It likewise can easily be moved about the plant for part time duty, still further reducing mixing costs. It is available in 100, 300 and 600 gal. sizes.

Complete Portable Filtration Unit

A new, small, portable, complete filtration unit has been developed by T. Shriver & Co., Harrison, N. J., which meets the needs of many industrial laboratories, pilot plants and regular production in processing.



With all of the features of the larger filtration units this new portable equipment is particularly adaptable to use in pilot plants and experimental laboratories.

This unit consists of a Shriver plate and frame type pressure filter of as many chambers as may be required. The one illustrated has 8 chambers which provides capacity for filtering up to 90 gals. of fluid per hour. For clarification of liquids containing a small percentage of solids, recessed solid frames are supplied; otherwise the frames may be hollow to allow for greater cake capacity.

Filter is fed by a Shriver Diaphragm Pump, directly connected to a ¼ H. P. motor, together with a starting switch, cord and electric plug, all mounted on a portable stand on roller bearing casters. The entire equipment measures overall only 35" long, 16" wide.

Plates and frames and the liquid ends and other parts of the pump coming in contact with the fluid can be made of any metal that is best suited to withstand the chemical and physical characteristics of the material handled.

Junior Type Feeder

A junior model of the standard type feeder (for adding chemicals to feed waters) produced by D. W. Haering & Co., Chicago, Ill., has just been announced. The model "B" junior is a sensitive accurate proportioning unit equipped with sight feed indication which operates on the famous Haering fluid piston principle.

Thermal Overload Switch

A new thermal overload switch for fractional horsepower motors, operating on line current and arranged for convenient mounting on the conduit or terminal box of the motor, has recently been placed on the market by G. E., Schenectady, N. Y. It is completely self-contained and has no links or plugs to be replaced.

Checking Dust Conditions

The dust counter pictured combines in one piece of moderately priced equipment everything you need for checking dust conditions. Instrument combines in one unit both the necessary air sampling device and a dark field microscope viewing and counting system, mounted on a circular base, provided with illuminating apparatus and suitably cased for safe transportation and storage.

A practical piece of equipment for checking dust conditions in plants.

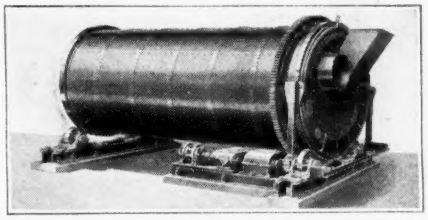
Air sampling mechanism consists of a moistening chamber through which the air is drawn by means of an accurately calibrated hand pump of 1/1000 cu. ft. capacity and an impinging device which deposits the dust particles suspended in the air on a circular glass plate within the instrument. The dust deposit is in the form of a ribbon. Twelve samples may be collected on one slide. These samples may be viewed and counted at once without removal. They may also be preserved for future reference simply by sealing a cover glass to the slide or, when desired, examined on the stage of a regular laboratory-type compound microscope. Bausch & Lomb, Rochester, N. Y., is the maker.

Improved Temperature Controllers

C. J. Tagliabue Mfg. Co., Park & Nostrand aves., Brooklyn, N. Y. announces improvements in its 30 year old line of self-operating temperature controllers. These improvements include an entirely new design of flexible seamless metal bellows and numerous minor refinements of design, material, and workmanship.

Chemical Pumps For Small Quantities

A special line of chemical pumps is announced to handle unusually small volumes, varying from 10 to 100 gallons in 24 hours. These pumps will operate against pressures up to 500 lbs. and are particularly adapted to handle a boiler feed water treatment. The units described are both rocker arm type (power to be reciprocating pump) and motor driven type. The manufacturer is Milton Roy, 2031 E. Madison st., Philadelphia, Pa.



Photograph of the new Link-Belt Rotary Louvre Dryer described in an earlier issue.

New Products and Processes

A Digest of Chemical Uses and U.S. Patents

A resinous dry film adhesive for plywood, known as Tego, developed by Resinous Products & Chemical Co.

Industrial Uses of Titanium Oxide

By G. F. New, Ph.D

British Titan Products Co., Ltd.

IN the products of a wide-spread range of industries there is a demand for whiteness and a clean appearance such as, for instance, paints, rubber, plastics, paper, leather, etc. This demand for whiteness is probably based on a fashion which, however, is not transient, but appears to remain constant and strong from year to year. Whiteness can be obtained in two ways; first, by the bleaching out or destruction by chemical or other means of the coloring matters inherent in the basic substance; second, by the addition of intense whitening materials which will obliterate the residual color in the basic substance and impart their own brilliance and purity of appearance.

The days when white lead was the only white pigment in common use have passed, and for decades now new white pigments have been produced, each more intense in its action than the last. The latest in this series is titanium dioxide and it surpasses, in degree of whitening action or tinting strength, all its predecessors. In oil, for instance, it has a tinting strength of approximately eleven times that of white lead. That is to say, if two greys are made up to match from the same amounts of black and in the one case white lead, and in the other titanium dioxide, the weight of titanium dioxide needed will be only one-eleventh that of the white lead. The reason for this powerful action is based on two characteristics of the new pigment, (1) its extraordinarily high refractive index, and (2) its very fine particle size. The higher refractive index indicates that an unusually high degree of bending is induced when a ray of light passes from air into the solid, as well as an unusually high degree of surface reflection from the particle back into the air.

Effect of High Refractive Index

In a layer of pigment particles, this transition from air to solid occurs, even in a thin layer, many times. The result of the solid having a high refractive index is that the scattering of the incident radiation is high and that the contrast in a background is obliterated in a thinner layer than would be the case if the refractive index were lower. In other words, the pigment of high refractive index has exceptional obliterating or covering power. The finer the particle size, moreover, the more frequently does the incident light meet an interface between solid and air and, therefore, more scattering is induced in a layer of a given thickness, again resulting in an intensification of obliterating power. The same argument applies if air is displaced by oils as in a paint or rubber or plastic or other material.

The actual refractive index of titanium dioxide is given as between 2.5 and 2.7 by various authorities. The determination of refractive indices of this order is not at all easy and this accounts for the slight variation in the figures quoted. The average particle diameter of titanium oxide on the British market is less than 0.001 mm., only the small percentage of 0.025 being retained on a standard 325 mesh screen. Other characteristics of the pigment are specific gravity 3.9 and oil absorption with linseed oil, 24 grams of oil to 100 grams of titanium oxide. The pigment is neutral in chemical character, is quite inert and, therefore, does not react with any type of medium in which it may be used, and finally is completely non-poisonous.

Although the superior properties of titanium oxide as a white pigment, over the older white pigments have long been known, the development of its large-scale production is comparatively recent. The difficulty of preparing pure titanium oxide from the mineral ilmenite on an economic basis, was finally overcome just after the great war and since then the growth of its production has been phenomenal. Until then titanium remained to most industrial chemists of little more than academic interest, but paradoxically the supplies of this rare element are both abundant and widespread. Although found in traces in many rocks and minerals, there are a few minerals which are substantially pure titanium oxide such as rutile and brookite. The minerals which occur in greatest abundance, however, are the titaniferous iron ores which consist essentially of titanate of iron. The mineral ilmenite is such an ore and it is estimated that the ilmenite deposits of Norway contain some 30,000,000 tons of available ore.

Extraction of Titanium Oxide

Several methods of extraction of pure titanium oxide from this ore were tried, but all were eventually abandoned in favor of the direct decomposition of the ilmenite by sulfuric acid. The principle of this method is that the titanium ore is treated with concentrated sulfuric acid, when a violent reaction takes place, the mineral being converted into a mass of soluble sulfate of iron and titanium. This is extracted with water and the solution warmed and agitated. If the conditions are properly regulated, the titanium sulfate is hydrolyzed almost completely and is precipitated as a titanium hydroxide, which can be separated from the iron sulfate left in solution by filtration and washing. In order to form a satisfactory pigment from this titanium hydroxide, it is necessary, not only to convert it into anhydrous oxide, but to be sure that this oxide is in just the right physical condition. For this purpose the crude product is calcined under very carefully regulated conditions. This results in a chemically stable pigment possessing a high refractive index which, as has been mentioned above, is the most valuable property of titanium pigments and is responsible for their high tinting strength.

The number of processes and products in which titanium oxide can be used is steadily increasing. These uses depend mainly upon the intensity of the whiteness of titanium oxide, and to a smaller extent upon its inertness, resistance to chemical action and non-toxic properties.

The Largest Outlet

The largest outlet is in paints, lacquers and enamels. Here it is used on account of its intense opacifying and whitening effect. The ordinary commercial grade of the pigment containing 98 per cent. of titanium oxide, is, for instance, approximately eleven times as strong in tinting power as white lead, but while great opacity is often the chief factor in selecting a pigment for such purposes, one must not overlook other properties. It would be useless, to incorporate in a paint, a pigment which would react excessively with the medium. In this direction again, titanium oxide is a distinct asset because it ensures chemical stability in addition to extreme opacity. It can consequently be used in some types of the newer paint mediums with which the more active older pigments form an unusable mass. As titanium oxide is not attacked by sulfur dioxide or other gases, it retains its whiteness in the most impure urban atmosphere. Exterior paints containing titanium oxide will also retain their brilliant whiteness indefinitely, owing to a surface-cleaning action which proceeds automatically.

In stoving enamels, for application in tin printings, etc., a very thin coat is applied and the maximum opacity in the pigment is essential. Titanium oxide is used for this reason and also because it suffers least yellowing of any pigment in the subsequent stoving processes.

Printing inks are somewhat similar to oil paints in general character, but their effect has generally to be produced in one coat instead of the several coats of a paint which may be applied. Moreover, the single coat of the printing ink is much thinner than the ordinary coat of paint. The question of opacity is, therefore, of paramount importance and in whites and light tints titanium oxide is used to a very large extent to obtain satisfactory obliterating power.

In most varieties of paper, titanium oxide has found a use, mainly in order to increase opacity and whiteness. Opacity is of particular importance in very lightweight papers such as India, Bible and Air-Mail, and titanium oxide definitely reduces the tendency to "show-through" of print in these papers. Furthermore, the weight of the paper is reduced, with corresponding reductions in postal charges.

In rubber, titanium oxide produces the same whitening effect as a much higher proportion of other white pigments. Since the elasticity of the rubber depends inversely upon the proportion of solid fillers it contains, this factor is important in the manufacture of such articles as bathing caps, rubber clothing, etc. Because of its non-toxicity, titanium oxide can be used for whitening such goods as rubber bands for sealing food containers and in surgical requisites. It also finds an extensive use in white rubber footwear, rubber flooring and golf balls. Titanium oxide is free from undesirable impurities, and has no retarding effect on the action of vulcanization accelerators. Titanium oxide is also used in the delustering process for artificial silk, and here again, very small quantities are required to produce the desired effect.

Another field for titanium oxide is the ceramic industry. Vitreous enamels containing titanium oxide have been shown to be markedly resistant to the action of acids and alkalies, and are used to coat vessels intended for chemical processes where purity of product is an important factor. Domestic hollow-ware coated with such enamels, resists the action of fruit acids, and is non-injurious to health because of the non-toxicity of titanium oxide.

Other industries in which titanium oxide finds a ready welcome include linoleum, artificial leather, leather finishes, shoe creams, shoe cleaners, and plastics. Because of its non-toxicity, it is also a very valuable whitening agent in soaps, face powders, dental creams and other cosmetics. By-products of the titanium oxide industry are air floated ilmenite, which is employed as a cheap black pigment, and ferrous sulfate, which is produced in the initial extraction of the ilmenite with sulfuric acid. Abstracted from *Sands, Clays, and Minerals,* November 1936.

Miscellaneous

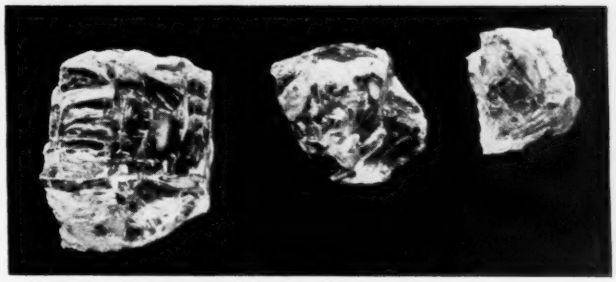
Acme Copper Pigment, a pure protective copper colloid for perfect wood and metal protective coatings, marine and antifouling paints, etc., of interest to paint, paper and insecticide manufacturers is being marketed by A. E. Starkie Co., 1645 S. Kilbourn Ave., Chicago, Ill.

Rubber Adhesives

A complete line of Marbonized Rubber Adhesives providing a permanent bond over a wide range of temperature fluctuations and said to provide a stronger and more lasting bond than most other adhesives has been developed by the Marbon Corporation, 469 E. Ohio St., Chicago. In addition, these adhesives provide a compensating factor for unequal expansion and contraction of adhered surfaces, and will adhere any surface to any other surface.

Combination Tannages

A survey on synthetic tanning for basils and combination tannages may be found in *The Leather Trades Review*, Dec. 9, '36, p. 1603.



Crystal-Clear Hydrocarbon Resin

Nevillite is a uniformly pure, inert, hydrocarbon resin, providing excellent resistance to breakdown by acids, alkalis and water. It is alcohol resistant and exhibits a permanent high gloss. Due to its very low acid number, it may be used with any type of pigment without fear of reaction. Manufacturer, The Neville Company, Neville Island Post Office, Pittsburgh, Pa., states that among its properties are light stability, unusual solubility, wide compatibility, chemical resistance and transparency. Sample shown above.

Resins for Industrial Bonding Applications

A new line of improved thermosetting phenolic resins in both liquid and powdered forms designed for numerous industrial bonding applications is announced by General Plastics, Inc., No. Tonawanda, N. Y.

Resin Sealer Stops Grain-Raising

Laux REZITE Sealer, new resin sealer and preservative, manufactured by I. F. Laucks, Inc., Seattle, Wash., has been developed to make the finishing of wood and wood products easier and more economical, and its chief virtue is the prevention of grain-raising.

Glycerine Substitute

Aqualube is a glycerine substitute developed by Glyco Products, New York City. Product is a light yellow liquid, water-soluble, non-hygroscopic, and non-sticky; does not dry, crystallize or turn rancid. Because of its lubricating value, it also replaces sulfonated oils where a high degree of lubrication is desired. It is soluble in glycerine and isopropyl alcohol, and is an excellent plasticizer for glues, gums, shellac, casein, etc.

Waterproof, Water Wax Solution

Aryl Wax, a synthetic wax having the characteristics of Carnauba wax, is a product of The Beacon Co., 89 Bickford St., Boston, Mass. It readily emulsifies to form a water-wax emulsion of stable nature, and when coated on a clean surface, a hard, transparent film is left on drying which is waterproof. With the aid of Aryl Wax resultant solutions are not only waterproof to cold water but are waterproof in the presence of hot water, up to the melting point of the wax.

Borax Used in Apple Orchards

The value of boron compounds to the apple grower, particularly in New Zealand, has been demonstrated by Askew and Chittenden, *J. Pom. and Hort. Sci.*, 14, 3, 227, 1936, through *Nature*. Authors found that hydrated borax applied as a top dressing will rapidly increase the boron content of certain soils to a depth of 18 inches, and is readily absorbed by Jonathan and Dougherty trees. The boron content of apples from a healthy area and free from "internal cork" was similar to that of fruits from unhealthy soil receiving 100 lbs. borax per acre.

Colored Newsprint

A new newsprint in which the color is manufactured in the paper itself, thus permitting the roll to be handled in the press room just like ordinary white newsprint, is now on the market. *The Paper Industry*, January '37, p840.

Fertilizers Induce Plant Growth in Fish Ponds

Fertilizers are being widely used in Czechoslovakian commercial fish ponds, according to a report to the Commerce Department's Chemical Division. The soils forming the bottom of these ponds are very poor; thus making necessary use of fertilizers in order to induce plant growth. Considerable quantities are also used in the U. S. in connection with fish breeding.

Safety Glass

A new kind of case-hardened or heat-treated glass is obtained by a process from which a strength four and one-half times that of ordinary glass is attained. *New York Times*, Science, Jan. 10, '37.

Lactic Acid as Flavoring Material

Lactic acid, made almost entirely from potatoes in Germany, is gaining favor there as a flavoring material and preservative, displacing citric and tartaric acids to some extent, according to a report to the Commerce Department's Chemical Division. Large quantities are being used in lemonades, essences, extracts, fruit juices and syrups; some is used as a preservative in canned vegetables and fish.

Rust-proof Steel

"Roneusil," new German rust-proof steel, possesses a "warm" color comparable to silver, in addition to being very ductile and therefore suitable for a variety of pressed-metal articles. This alloy incorporates 8 to 9 per cent. chromium and 12 per cent. manganese, but no nickel, and is manufactured by Röchlingstahl G.m.b.H., of Völklingen, Saar.

Microfilm for Recording Printed Data

Book, newspaper, or manuscript pages may now be photographed on a microfilm and minified as little as two-thousandths of its original area. Film is reported by Bureau of Standards as comparable to record paper in its permanency. *Industrial Bulletin* of Arthur D. Little, Inc., Jan. '37.

Typewriter Ribbons from Bemberg Yarn

Typewriter ribbons made of specially processed fine denier, multi-filament Bemberg yarns are announced by Remington Rand, Inc. This is the first time synthetic yarns have been used commercially for this purpose, and opens up an important and heretofore unexploited market. The ribbon makes possible clear, sharp letters having the appearance of printed type. Uniformly longer ink life than any ribbon on the market and exceptional durability are important qualities of these new ribbons.

Rubberizing Compound Requires No Primer

Selfvulc Insulator, a rubber compound which incorporates the quality of a primer with a self-curing, cold-curing rubber which can be applied by unskilled labor by dipping, spraying or by hand brushing, is announced by the Self Vulcanizing Rubber Co., 605 W. Washington Blvd., Chicago, Ill. Product makes a steadfast bond in one application, but repeat coats to any desired thickness may be added. A vulcanizing period of one hour is all that is required for first or following coats. There is practically no shrinkage in application, the product being 90 per cent. pure rubber, and it gives a very smooth, enamel-like finish on any surface.

Chemicals in Subterranean Foundations

Calcium chloride is being used in Germany for reinforcing shifting sands and other loose formations under building foundations, according to a report from the American Consulate, Frankfort-on-Main, made public by the Commerce Department's Chemical Division.

Wool Substitute

A process for manufacturing a fiber from rubber which is said to be suitable as a substitute for wool and for the manufacture of cloths is reported. The patented process has been acquired by the Mitsui Co. which is establishing a factory at Kawagoe, Japan, for the production of the new fiber.

Elastic Threads

Round latex thread, of German manufacture, is known as Rontex, and grooved latex thread is called Quartex. The latter is preferred where greater adhesion of the elastic material in the woven or knit goods is desirable. The latex thread is available not only in the natural color, but also colored white or red. *India Rubber World*, Jan. 1, '37, p72.

Delustering Artificial Silks

Artificial silks of the regenerated cellulose type and natural silk are delustered by first steeping the materials in or by printing thereon a solution of a soluble stannate, then washing with hard water so as to form an insoluble calcium stannate in the materials. E. P. 455,209 states, pattern effects may also be produced by printing with citric or other acid materials which have been delustered all over. Colors or discharges may be added to the printing solutions. The steeping and washing operations may be repeated, and after each successive washing operation the materials may be treated with sodium carbonate, phosphate or silicate solution. Specification 408,240 is referred to.

Water Repellents

Laurel Splashproof No. 5 and Laurel Water Repellent 5-C comprise a series of water repellents for use on all type fabrics, including hosiery, upholstery, sportswear and piece goods—rayon and combinations. These products are used in the single bath process and will produce a good handle in addition to a satisfactory water repellent effect without coating. Laurel Soap Mfg. Co. is the producer.

Textile Finishing Agents

Rayonole "B" is an oil finish manufactured by Laurel Soap Mfg. Co., especially adapted for the softening and finishing of rayon and synthetic yarn fabrics. It has a very hygroscopic effect and will leave the fabric with a full, soft handle. Goods processed with this will not deteriorate when stored. Laurel Supersulfates, also new, give an efficient detergent and scouring action on all type fabrics; are stable in alkali or acid solutions and very effective when used for the breaking down of lime soaps.

Month's New Dyes

General Dyestuff releases include Fastusol Blue LF3GL, a homogeneous direct dyestuff, which produces a very bright greenish shade of blue, possessing exceptional fastness to light. Fastusol Violet LFFR is another homogeneous direct dyestuff which produces exceptionally clear and bright violet shades of very good fastness to light. Anthralan Orange GG is offered as a level dyeing Acid Orange of good fastness to light.

Du Pont's Dyestuffs Division has placed on the market the following dyes: Diagen Red M2B (Patented), a new development in the field of stabilized azoic colors for printing. Product yields prints which are fast to power laundry washing with chlorine and which show good fastness to light. Pontamine Yellow S3G, a new direct yellow, is offered especially for the dyeing of paper although it is applicable to textiles as well. Pontachrome Black P2B is very fast to alkali, carbonizing, fulling, stoving, light, perspiration, water and washing. Pontachrome Black P2B is an addition to the du Pont group of chrome blacks. Lithosol Rubine 3G Powder is used chiefly as the calcium or strontium salt for the production of printing inks and lacquers. Color has good light fastness and is non-bleeding in oil and lacquer solvents. Halopont Pink 2B is a pigment color which produces extremely brilliant shades of pink on paper. It is very fast to light and, while it may be used as a self color, it is of particular interest for shading the "Halopont" and other pigment blues used in the tinting of medium and high grade white papers. It is also of considerable interest for coated paper.

U. S. Chemical Patents

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Method of treating plants with finely ground natural silicic acid or a mixture of finely divided silicic anhydride, manganese salts and iron salts. No. 2,065,241. Carl Oetling, Berlin-Steglitz, Ger.

Preparation of wettable sulfur by the treatment of non-wettable sulfur with a small quantity of evaporated residue from the sulfite digestion of wood. No. 2,067,397. Arthur H. Henninger, St. Albans, N. Y., to General Chemical Co., N. Y. City.

Process for making double or treble (calcium) superphosphate from comminuted dry limestone and phosphoric acid. No. 2,067,538. Walter H. MacIntire, Knoxville, Tenn.

Process for preparing ammonium sulfate directly from SO_2, ammonia, and oxygen. No. 2,067,899. Gilbert A. Bragg, Pittsburgh, to Koppers Co., Del.

Composition and process for the production of fertilizers. No. 2,067,931. Walter H. Kniskern, Petersburg, Va., and Charles K. Lawrence, Baldwinsville, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Cellulose and Derivatives

Manufacture of shaped articles from viscose. No. 2,064,915. Emil Hubert, Dessau, and Hermann Hecht, Dessau, to I. G., Frankfort, Ger.

Preparation of fibrous cellulose such as flax fibre from plants or stalks. No. 2,064.929. George A. Lowry and Jim A. Grant, N. Y. City, to Martin Hill Ittner, Jersey City, N. J.

Dissolving and softening cellulose acetate with the aid of 5.5-dimethyl-1.3-cyclotetramethylene-dioxide in process for the manufacture of filaments, etc. No. 2,065,125. Henry Dreyfus, London, Eng.

Process of manufacturing viscose from wood. No. 2,065,188. Karl Kosslinger and Alfons Bayerl, Dessau in Anhalt, to I. G., Frankfort, Ger.

Method of forming artificial filaments by extruding an organic derivative of cellulose and a relatively non-volatile ester of a fatty acid in a solvent. No. 2,065,517. Camille Dreyfus, N. Y. City, and William Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Method of manufacturing artificial articles from an acetone solution of an acetone-soluble organic derivative of cellulose containing in solution a higher fatty acid. No. 2,065,518. Camille Dreyfus, N. Y. City, and William Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Process for manufacturing artificial filaments, etc., from organic derivatives of cellulose. No. 2,065,519. Camille Dreyfus, N. Y. City, and William Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Manufacture of filaments, etc., by the extrusion at elevated temperatures of a cellulose derivative dissolved in a polyhydric alcohol into a cool gaseous atmosphere, said alcohol dissolving the cellulose derivative only at elevated temperatures; the alcohol and cellulose derivative separating after extrusion. No. 2,065,664. William Alexander Dickie and Percy Frederick Combe Sowter, Spondon, Eng., to Celanese Corp. of America, Del.

Method of manufacturing strong filaments from cellulose derivatives. No. 2,065,668. Henry Dreyfus, London, Eng.

Process for manufacture of bulbous artificial filaments from organic derivatives of cellulose. No. 2,065,766. William Ivan Taylor, Spondon, Eng., to Celanese Corp., Del.

Process for preparing an organic acid ester of cellulose in a fibrous form. No. 2,066,571. Louis M. Minsk, William O. Kenyon, and Harry LeB. Gray, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Process for the stabilization of cellulose esters. No. 2,066,584. Otto Sindl, Berlin, Ger.

Treatment of filaments, etc., made of cellulose derivatives with an alkylolamine salt of a hydroxy carboxylic acid containing not more than 6 carbon atoms. No. 2,067,219. William Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Process for production of artificial filaments from a solution comprising an organic derivative of cellulose and an alkylolamine salt of a resin acid. No. 2,067,220. William Whitehead, Cumberland, Md., to Celanese Corp. of America, Del.

Cellulose ester compositions, particularly for molding purposes. No. 2,067,310. Harold Allden Auden, Banstead, Hanns Peter Staudinger, Great Burgh, Esom, and Philip Eaglesfield, Carshalton, Eng.

Process of manufacture of pulp from fibrous or cellulose bearing material. No. 2,067,480. Joaquin Julio de la Roza, Sr., Great Neck, N. Y., to de la Roza Corp., Wilmington, Del.

Method for the preparation of aralkyl ethers of cellulose. No. 2,067,853. Eugene J. Lorand to Hercules Powder Co., both of Wilmington, Del.

Process for production of artificial filaments, etc. No. 2,067,905. William Alexander Dickie, Robert Wighton Moncrieff, and Charles William North, Spondon, Eng., to Celanese Corp. of America, Del.

Process for preparing ethyl cellulose from granulated cellulose and ethyl chloride in the presence of caustic soda, water, and benzene. No. 2,067,946. Norman Picton, Stevenston, Scotland, to Imperial Chemical Industries, Ltd., Gt. Brit.

Process for improving the properties of filaments or yarns composed of an organic acid ester of cellulose or cellulose ethers by applying a finish thereto composed of an animal or a vegetable oil and hydroquinone. No. 2,067,951. George Schneider, Montclair, N. J., to Celanese Corp. of America, Del.

Manufacture of artificial filaments by the evaporative method from solutions of cellulose acetate or the like. No. 2,068,538. Henry Dreyfus, London, and William Ivan Taylor, Spondon, Eng., to Celanese Corp. of America, Del.

Coal Tar Chemicals

Polynuclear condensation products containing keto groups. No. 2,065,026. Alfred Rieche, Wolfen, Ger., to General Aniline Wks., N. Y. City.

Process for finishing moist, freshly plastered walls which comprises treating with a waterproofing coat containing rubber latex before painting. No. 2,065,069. George L. Hadden, South Orange, N. J., to Doherty Research Co., N. Y. City.

Water-soluble diazoimino compounds and their production. No. 2,065,593. Herbert A. Lubs to du Pont, both of Wilmington, Del.

Dihydroxystilbene-dicarboxylic acid and a process for preparing it. No. 2,065,900. Leopold Laska and Oskar Haller, Offenbach-on-the-Main, Ger., to General Aniline Wks., N. Y. City.

Distillation product of low temperature coal tar having a resinous character. No. 2,066,386. Frank H. Bergeim, Leonia, N. J., to The Barrett Co., N. Y. City.

Catalytic hydrogenation and dehydrogenation of organic compounds. No. 2,066,496. Marion D. Taylor, Berkeley, Calif., to Shell Development Co., San Francisco.

Method of preserving wood by impregnation with a tarry oil. No. 2,066,583. Grant B. Shipley, Pittsburgh.

Process for reducing a compound of the class consisting of quinone and quinhydrone in a neutral aqueous solution to hydroquinone in the presence of zinc particles. No. 2,066,951. Joseph Schumacher, Peru, Ill., to Carus Chemical Co., Ill.

c-nitrotetrazole compounds. No. 2,066,954. Edmund von Herz, Cologne-Dellbruck, Ger.

Method of cooling phthalic anhydride vapors and recovering a solid crystalline product. No. 2,067,019. Riewen Riegler, Buffalo, to National Aniline and Chemical Co., N. Y. City.

Process for cooling and washing producer gas. No. 2,067,029. Paul Van Ackeren, Essen, Ger., to Koppers Co., Del.

Condensation products of the azabenzanthrone series and process of making the same. No. 2,067,127. Max Albert Kunz, Mannheim, and Gerd Kochendoerfer, Ludwigshafen-on-the-Rhine, Ger., to General Aniline Wks., N. Y. City.

Solid diazo salts. No. 2,067,132. Karl Schnitzpahn and Wilhelm Koch, Offenbach-on-the-Main, Ger., to General Aniline Wks., N. Y. City.

Nuclear substituted acenaphthalic acids and 1.4.5.8-naphthalenetetracarboxylic acids and process of preparing them. No. 2,067,138. Wilhelm Eckert and Ernst Fischer, Frankfort, Ger., to General Aniline Wks., N. Y. City.

Manufacture of aromatic aldehydes of the benzene series. No. 2,067,237. Leonard Eric Hinkel, Swansea, Glamorgan, Wales, to Imperial Chemical Industries, Ltd., Gt. Brit.

Thioacrolein. No. 2,067,261. John Delson, N. Y. City, to Flint & Co., N. Y.

Polyamines and process for making the same. No. 2,067,291. Paul L. Salzberg to du Pont, both of Wilmington, Del.

Method of melting pitch of high melting point. No. 2,067,450. Harold Everett Imes, Ashland, Ky., to The Barrett Co., N. Y. City.

Dithiocarbamates. No. 2,067,494. Joy G. Lichty, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.

Process for recovering valuable products from hydrocarbons containing dienes. No. 2,067,511.. Georg Stern, Neckargemund, and Werner Hoess, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Process for preparing alkali thiocyanates which comprises heating a suspension of zinc cyanide in an aqueous alkali carbonate solution with at least one of the group consisting of sulfur and an alkali thiosulfate. No. 2,067,606. Edward L. Helwig, Bristol, Pa., to Rohm & Haas Co., Philadelphia.

Ethers of dihydric phenols. No. 2,067,960. James H. Werntz, Marshallton, Del., to du Pont, Wilmington, Del.

Preparation of acetaldehyde. No. 2,068,010. Henry Dreyfus, London, Eng.

Production of beta-brazin-5, 11-dione by treating beta-napthylenephenylene oxide with an oxidizing agent from the group consisting of oxidizing compounds of chromium, oxygen, and the higher oxides of nitrogen. No. 2,068,197. Curt Schuster and Franz Broich, Ludwigshafen-on-the-Rhine, Ger., to General Aniline Wks., N. Y. City.

Process for preparing road material from materials condensed from vapors produced in a standard by-product coke oven plant. No. 2,068,304. Edmund O. Rhodes, Pittsburgh, to Koppers Co., Del.

Compounds of the anthraquinone series and process for producing the same. No. 2,068,313. William Dettwyler, Milwaukee, to du Pont, Wilmington, Del.

Benzoyl benzoic acid compounds and process for producing the same. No. 2,068,321. Ivan Gubelmann, Wilmington, Del., and John M. Tinker, Penns Grove, N. J., to du Pont, Wilmington, Del.

Preparation of aralkylamino-anthraquinone compounds. No. 2,068,371. Edwin C. Buxbaum, Shorewood, Wis., to du Pont, Wilmington, Del.

Preparation of aralkylamino anthraquinone compounds. No. 2,068,372. Edwin C. Buxbaum, Shorewood, Wis., to du Pont, Wilmington, Del.

Process for preparing diamino-diphenoxy-anthraquinone disulphonic acids. No. 2,068,373. Edwin C. Buxbaum, Shorewood, Wis., to du Pont, Wilmington, Del.

Coatings

Process for preparing an air drying coating composition by the reaction of an amido compound with an aldehyde. No. 2,064,876. Howard L. Bender, Bloomfield, N. J., to Bakelite Corp., N. Y. City.

Method of coating metal with nitrocellulose or cellulose ester coatings and a cellulose ether lacquer coating. No. 2,065,769. Emory H. Trussell to Beckwith-Chandler Co., both of Newark, N. J.

Method of making moistureproof gelatine sheet material. No. 2,065,792. William Hale Charch, Buffalo, N. Y., to du Pont, Wilmington, Del.

Rubber coated fabric sheeting having a top coating of dried varnish comprising gilsonite, drying oil vehicle and carbon black. No. 2,065,881. Alfonso M. Alvarado and Harold J. Barrett to du Pont, all of Wilmington, Del.

Method of decorating a composition board made from a fibrous material and an asphaltic binding material. No. 2,066,341. Karl Eichstadt, Berlin-Charlottenburg, Ger., to Oxford Varnish Corp., Detroit.

Coating composition which resists mold growth comprising a resin of the class consisting of fatty oil and fatty oil acid modified polyhydric alcohol-polycarboxylic acid resin and an organic compound of mercury. No. 2,066,363. Gordon Derby Patterson to du Pont, both of Wilmington, Del.

Method of making laminated sheet from impregnated cellulosic lamina. No. 2,066,421. Kurt Ripper, Berlin-Lichterfelde, Ger.

Nonsagging brushing lacquer containing a cellulose derivative base, a slow drying solvent therefor, a heavy metal soap of tung oil acids and suitable solvents and diluents. No. 2,066,643. Glenn H. Pickard, Wilmette, Ill., to Commercial Solvents Corp., Terre Haute, Ind.

Method of forming a phosphate coating on iron, steel, zinc, magnesium, and their alloys. No. 2,067,007. Van M. Darsey to The Patents Corp., both of Detroit.

Method of producing a phosphate coating on metal. No. 2,067,214. Robert R. Tanner, Highland Park, Mich., and John S. Thompson, Detroit, to The Patents Corp., Detroit.

Method of bonding siccative coats to metal. No. 2,067,215. Robert R. Tanner, Highland Park, Mich., and John S. Thompson, Detroit, to The Patents Corp., Detroit.

Method of bonding siccative coats to metal. No. 2,067,216. John S. Thompson, Detroit, and Herman J. Lodeesen, Berkley, Mich., to The Patents Corp., Detroit.

Coated material and method of making same. No. 2,067,488. Edward Hamilton Hough Jr., N. Y. City, to Fabrifax, Ltd., Wilmington, Del.

Method of producing cellulosic films from a cuprammonium cellulose solution. No. 2,067,522. Rudolf Etzkorn and Ewald Knehe, Wuppertal-Barmen, Ger., to I. P. Bemberg O. G., Wuppertal-Oberbarmen, Ger.

A coating of lampblack and sodium silicate to be applied to a metal before cold working. No. 2,067,530. Harry K. Ihrig, Milwaukee.

Baking varnish composition containing a phenol formaldehyde resin, a polybasic acid-polyhydric alcohol ester, natural gum resins, the gasoline insoluble portion of oxidized acid, a solvent and a phenol. No. 2,067,910. John Fletcher, Kenmore, N. Y., to Plastergon Wall Board Co., Buffalo.

Process for surface coating pigments such as zinc oxide, white lead, etc., with aliphatic acids such as stearic, oleic, etc. No. 2,068,066. William J. O'Brien, Shaker Heights, Ohio, to The Glidden Co., Cleveland.

A conductive paint for high resistance elements consisting of powdered carbon, a phenol-furfural resin, and an organic solvent. No. 2,068,113. Newton C. Schellenger and Willis E. Haselwood to Chicago Telephone Supply Co., all of Elkhart, Ind.

Method of producing non-smearing pressure-transferable color coatings on paper surfaces. No. 2,067,268. Frederick George Francis, Leyton, London, Eng., to Caribonum, Ltd., London, Eng.

A self-supporting non-reinforced potentially reactive adhesive film of reaction products of zinc chloride with urea and an aldehyde. No. 2,068,479. Albert Henry Bowen and Theodore Williams Dike to I. F. Laucks, Inc., all of Seattle, Wash.

Dyes, Stains, etc.

Azo-dyestuffs. No. 2,065,639. Gerald Bonhote, Basel, and Carl Apotheker, Riehen, Switz., to Society of Chemical Industry in Basle, Basel, Switz.

Mono-azo dyestuffs. No. 2,065,680. Richard Fleischhauer, Frankfort, Ger., to General Aniline Wks., N. Y. City.

Vat dyestuffs of the pyrenequinone series and process of making same. No. 2,065,710. Walter Kern, Sissach, Switz., to Society of Chemical Industry in Basle, Basel, Switz.

Process for finely dividing pigments and organic dyestuffs by milling in an aqueous medium containing 5 to 15% of an alcohol, ketone or ester. No. 2,065,762. Edmund Stanley, Spondon, Eng., to Celanese Corp. of America, Del.

Derivatives of amino-quinolines and method of making same. No. 2,065,879. Lorenz Ach and Christian von Hofe, to C. F. Boehringer & Soehne G. m. b. H., all of Mannheim-Waldhof, Ger.

Process for producing a finely divided crystalline anthraquinone dyestuff. No. 2,065,928. William R. Waldron to du Pont, both of Wilmington, Del.

Manufacture of naphthazarine dyestuffs. No. 2,066,119. Carl Mettler to firm of J. R. Geigy A. G., Basel, Switz.

Acid wool dyestuffs of the anthra-quinone series. No. 2,066,707. Klaus Weinand, Leverkusen-I. G. Werk, Ger., to General Aniline Wks., N. Y. City.

Dioxazine dyestuffs and a process of preparing them. No. 2,066,915. Karl Thiess and Fritz Maennchen, Frankfort, Ger., to General Aniline Wks., N. Y. City.

Dyes of the cyanine series. No. 2,066,967. Walter Dieterle and Walter Zeh, Dessau in Anhalt, and Werner Zerweck, Frankfort, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Water-insoluble azo dyestuffs. No. 2,066,985. Wilhelm Lamberz and Karl Burr, Leverkusen-Wiesdorf, Ger., to General Aniline Wks., N. Y. City.

Water-insoluble azo dyestuffs. No. 2,066,986. Wilhelm Lamberz, Leverkusen-Wiesdorf, Ger., to General Aniline Wks., N. Y. City.

Azo dyestuffs insoluble in water. No. 2,067,149. Werner Zerweck, and Norbert Steiger, both of Frankfort, August Modersohn, Cologne-Mulheim-on-the-Rhine, and Werner Schleifenbaum, Leverkusen, Ger., to General Aniline Wks., N. Y. City.

Acid wool dyestuffs of the anthraquinone series. Nos. 2,067,468, and 2,067,469. Klaus Weinand, Leverkusen-I. G. Werk, and Curt Bamberger, Cologne-Mulheim, Ger., to General Aniline Wks., N. Y. City.

Azo dyes for acetate silk and their production. No. 2,067,725. Heinrich Ohlendorf and Hans Lange, Dessau-in-Anhalt, Ger., to General Aniline Wks., N. Y. City.

Water insoluble monoazo dyes. No. 2,067,726. Heinrich Ohlendorf and Erich Baumann, Dessau-in-Anhalt, Ger., to General Aniline Wks., N. Y. City.

Vat dyeing process and composition. Nos. 2,067,926, 2,067,927, 2,067,928, 2,067,929 and 2,067,930. Jean G. Kern, Hamburg, N. Y., to National Aniline & Chemical Co., N. Y. City.

Acid safranine dyestuffs. No. 2,068,056. Eugen Huber and Wolfram Vogt, Leverkusen-I. G.-Werk, Ger., to General Aniline Wks., N. Y. City.

Anthraquinone dyes and process for preparing the same. No. 2,068,124. Samuel Ellingworth, Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Blackley, Manchester, Eng., to Imperial Chemical Industries, Ltd., Gt. Brit.

Mono-azodyestuffs. No. 2,068,172. Richard Fleischhauer, Frankfort, Ger., to General Aniline Wks., N. Y. City.

Preparation of dyestuffs of the anthraquinone series. No. 2,068,350. William L. Rintelman, Carrollville, and William H. Lycan, South Milwaukee, Wis., to du Pont, Wilmington, Del.

Explosives

Manufacture of salts of diazotized tetrazole derivatives. No. 2,064,817. Willi Brun, Bridgeport, Conn., to Remington Arms Co., Del.

Percussion cap comprising a loading of a priming composition containing 15% to 20% lead azide and 0.5 to 5% of guanylnitrosaminoguanyltetrazene and contiguous load comprising calcium silicide and barium nitrate. No. 2,065,929. Alfred Weale, Heswall, Eng., to Remington Arms Co., Bridgeport, Conn.

Explosive consisting of a pulverent initial detonating agent and a non-detonable elastic material from the group natural rubber, synthetic rubber, and rubber surrogate. No. 2,067,213. Walter O. Snelling, Allentown, Pa., to Trojan Powder Co., N. Y.

Method of coating paper shot shells by impregnating with paraffin and covering with a varnish containing a metallic soap. No. 2,067,586. Watson H. Woodford, Bridgeport, Conn., to Remington Arms Co., Del.

Fine Chemicals

Preparation of poly alkyl-substituted phenols. No. 2,064,885. Marion Scott Carpenter, Nutley, N. J., to Givaudan-Delawanna, N. Y. City.

Pyridine derivatives and process of making them. No. 2,064,944. Joachim Reitmann and Gerhard Hecht, Wuppertal-Elberfeld, Ger., to Winthrop Chemical Co., N. Y. City.

Pryidine derivatives and process of making the same. No. 2,064,945. Joachim Reitmann, Wuppertal-Elberfeld, Ger., to Winthrop Chemical Co., N. Y. City.

Method for obtaining slightly relieved photographic images. No. 2,065,302. Carlo Bocca and Luigi Amati, Padova, Italy.

Silver halide photographic emulsion containing symmetrical trimethane cyanine substituted symmetrically at the α — and α — carbon atoms by alkyl. No. 2,065,411. Walter Zeh and Wilhelm Schneider, Dessau in Anhalt, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Sensitizing of photographic emulsions. No. 2,065,412. Walter Zeh, Dessau in Anhalt, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Water-soluble metal complex compounds of the imidazole series. No. 2,065,418. Hans Andersag, Wuppertal-Elberfeld, and Heinrich Jung, Wuppertal-Vohwinkel, Ger., to Winthrop Chemical Co., N. Y. City.

Hydroxy diphenyl sulfide derivatives. No. 2,065,808. Treat B. Johnson, Bethany, Conn., to Sharp & Dohme, Philadelphia.

Manufacture of optically sensitized or hypersensitized silver halide emulsions containing ethylthiotriazoles. No. 2,066,099. Walter Dieterle, Dessau-Ziebigk in Anhalt, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Saturated-branched-chain-primary-alkyl ethyl barbituric compound. No. 2,066,280. Horace A. Shonle to Eli Lilly and Co., both of Indianapolis.

Alkoxyalkyl mercuric salts of polybasic acids. No. 2,066,367. Fritz Schonhofer. Wuppertal-Elberfeld, and Wilhelm Bonrath, Leverkusen-I. G. Werk, Ger., to Winthrop Chemical Co., N. Y. City.

Heteropolar compounds and method of producing the same. No. 2,066,542. Walther Schrauth, Berlin-Dahlem, Ger., to Deutsche Hydrierwerke A. G., Berlin-Charlottenburg, Ger.

Photographic material sensitive to ultra-violet light. No. 2,066,582. Samuel E. Sheppard and Waldemar Vanselow, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Stabilized terpene-oxide preparations. No. 2,066,717. Stanislaus Deichsel, Wuppertal-Elberfeld, Ger., to Winthrop Chemical Co., N. Y. City.

Photographic printing. No. 2,066,727. Gerd Heymer, Dessau-in-Anhalt, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

3-nitro-and 3-amino-derivatives of 4.6-diaminoquinolines. No. 2,066,730. Heinrich Jensch, Frankfort, Ger., to Winthrop Chemical Co., N. Y. City.

Complex compounds of 1-3-dimethylxanthene and a water soluble salt of m-hydroxybenzoic acid. No. 2,066,731. Walter Dropp, Wuppertal-Elberfeld, Ger., to Winthrop Chemical Co., N. Y. City.

Antimony compounds of polyhydroxy carboxylic acids and process of making them. No. 2,066,742. Hans Schmidt, Wuppertal-Vohwinkel, Ger., to Winthrop Chemical Co., N. Y. City.

Manufacture of photographic film. No. 2,066,850. Gale F. Nadeau, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Recovery of citric acid from impure solutions. No. 2,066,892. Pietro Leone to "Arenella" Societa Italiana per l'Industria dell' Acido Citrico ed Affini, both of Palermo, Italy.

Process for preparing positive pictures from a negative design using a light sensitive material sensitized by means of a mixture of silver nitrate and 1-diazo-4-aminobenzene. No. 2,066,918. Gottlieb von Poser and Robert Franke to Kalle & Co., A. G., all of Wiesbaden, Ger.

Trivalent polymetallo aryl compounds and the process of making them. No. 2,066,950. Hans Schmidt, Wuppertal-Vohwinkel, Ger., to Winthrop Chemical Co., N. Y. City.

Photographic material which comprises a silver halide emulsion containing a trimethinecyanine dye. No. 2,066,966. Walter Dieterle and Walter Zeh, Dessau in Anhalt, and Werner Zerweck, Frankfort, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Photographic material comprising a silver halide emulsion containing a trimethinecyanine salt. No. 2,066,968. Walter Dieterle and Walter Zeh, Dessau in Anhalt, and Werner Zerweck, Frankfort, Ger., to Agfa Ansco Corp., Binghamton, N. Y.

Organic mercury silicate and process of preparing same. No. 2,067,100. Fritz Schonhofer, Wuppertal-Elberfeld, and Wilhelm Bonrath, Leverkusen-I. G. Werk, Ger., to Winthrop Chemical Co., N. Y. City.

Hexyl catechol and process of producing it. No. 2,067,452. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., Del.

Method and material for obtaining photographic contrasts. No. 2,067,690. Roelof Jan Hendrik Alink, Klaas Hinderikus Klaassens, and Harke Jan Houtman, Eindhoven, to N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands.

Cinematographic film. No. 2,067,957. Hans von Fraunhofer to Trichrome, Inc., both of N. Y. City.

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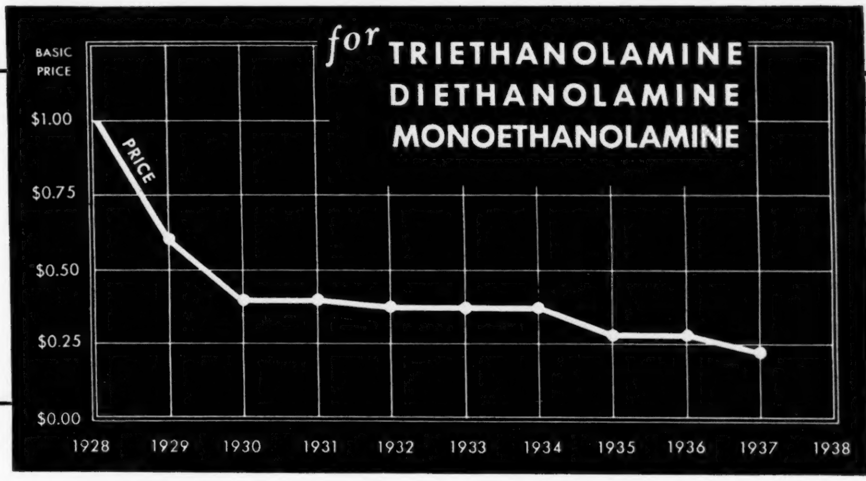

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Process of making glucosides from digitalis purpurea. No. 2,068,027. Friedrich Jager, Mannheim, Ger., to Rare Chemicals, N. Y. City.

Thio-and seleno-carbocyanines. No. 2,068,047. Walter Zeh, Dessau in Anhalt, Adolf Sieglitz, Frankfort, and Martin Dabelow, Frankfort, to Agfa Ansco Corp., Binghamton, N. Y.

Bismuth salts of arseno compounds and a process of preparing them. No. 2,068,206. Karl Streitwolf, Frankfort, Alfred Fehrle, Bad Soden-on-the-Taunus, and Walter Herrmann, Frankfort, Ger., to Winthrop Chemical Co., N. Y. City.

Halogen-amino-flavanthrones and process of producing the same. No. 2,068,312. William Dettwyler, Milwaukee, to du Pont, Wilmington, Del.

Arylazodiamino-picolines. No. 2,068,353. Herman J. Schneiderwirth, Laurelton, N. Y., to Picochrome Corp., Jamaica, N. Y.

Cyclic cyano compounds and process of producing same. No. 2,068,586. Karl Ziegler, Heidelberg, Ger., to Schering-Kahlbaum A. G., Berlin, Ger.

Glass and Ceramics

Method of making glass resistant to discoloration by hot alkali vapors. No. 2,065,852. Robert H. Dalton and Harrison P. Hood to Corning Glass Wks., all of Corning, N. Y.

Decoration of glass with permanently bonded colored synthetic resins. No. 2,066,497. George B. Watkins to Libbey-Owens-Ford Glass Co., both of Toledo, Ohio.

Means for and method of applying color to molded glass articles. No. 2,067,949. Anton G. Rez, Seattle, Wash.

Laminated glass and process of making the same. No. 2,068,082. James H. Sherts, Tarentum, Pa., to Duplate Corp., Del.

Glazed, semi-vitreous, earthenware bodies made from a mixture comprising clay from the class comprising ball clays, kaolins and china clay, and pyrophyllite and a small amount of a calcium compound. No. 2,068,154. Ira Elmer Sproat, Westport, Conn., to R. T. Vanderbilt Co., N. Y. City.

Industrial Chemicals, Apparatus, etc.

Apparatus for reclaiming char and bone black by the use of furnace flue gases. No. 2,064,813. Nathaniel R. Andrews, Yonkers, N. Y.

Process for removal of acid gases from waste gases by means of a mixed salt of the class consisting of tri-basic diammonium phosphates of the alkali metals and alkaline earth metals. No. 2,064,838. Walter R. Knapp, Pelham, N. Y., to Horvitz Patent Holding Corp., N. Y. City.

Preparation of an iron group metal catalyst for producing hydrogen by the reaction of a gaseous hydrocarbon and steam. No. 2,064,867. John C. Woodhouse to du Pont, both of Wilmington, Del.

Recovery of combined nitrogen from nitrosyl chloride. No. 2,064,978. Oskar Kaselitz, Berlin, Ger.

Process for conversion of alkali metal meta and pyro phosphates to ortho phosphates. No. 2,064,979. Oskar Kaselitz, Berlin, Ger.

Preparation of metal picrates by the reaction between silver picrate dissolved in a lower glycol ether and a metal halide. No. 2,065,110. John C. Bird to John Wyeth & Brother, Inc., both of Philadelphia.

Preparation of alkyl picrates by the reaction between silver halide dissolved in a lower monoalkyl ether of diethylene glycol and an alkyl halide. No. 2,065,111. John C. Bird, Montclair, N. J., to John Wyeth & Brother, Inc., Philadelphia.

Process for removing carbon dioxide from gaseous mixtures using certain amines. No. 2,065,112. Robert Roger Bottoms to The Girdler Corp., both of Louisville, Ky.

Process for producing lower aliphatic amino alcohols. No. 2,065,113. Robert Roger Bottoms, to The Girdler Corp., both of Louisville, Ky.

Method of determining solid content of liquid egg material. No. 2,065,114. Frank J. Cahn and Albert K. Epstein; said Cahn to said Epstein, Reynolds, and Harris, all of Chicago.

Diatomaceous earth product containing 80 to 85 parts diatomaceous earth, 5 parts sodium chloride, 2½ parts glucose, and 10 to 15 parts of a mixture of 90 to 95 parts of pulverized slag and 10 to 5 parts of carbonate of lime. No. 2,065,126. Arthur Fredrik Echberg to John C. K. Stuart, J. W. D. Greig, and W. Reay Featherstone, all of Toronto, Ontario, Can.

Method of hydrolyzing fat for the production of fatty acid and glycerol. No. 2,065,145. Jay R. Moore, Oakmont, and Earl K. Wallace, Pittsburgh; said Wallace to said Moore.

Reaction product of an alkaloid containing a pyridine ring and a resinous material. No. 2,065,190. Frank Floyd Lindstaedt, Oakland, to Hercules Glue Co., Ltd., San Francisco.

Batch process for coking coal. No. 2,065,288. Carl Otto, Essen-Ruhr, Ger.

Process for obtaining starch from corn. No. 2,065,313. Frederick L. Jefferies, La Grange, Ill., to International Patents Development Co., Wilmington, Del.

Method of producing unsaturated hydrocarbons containing 12 or more carbon atoms. No. 2,065,323. Charles A. Thomas, Wayne, and John F. Olin, Newtown Square, Pa., to The Sharples Solvents Corp., Philadelphia.

Method of preparing mixed esters by the reaction of a drying oil and a polyhydric alcohol and treatment of the reaction product with a polybasic organic acid. No. 2,065,331. Roy H. Kienie, Schenectady, to General Electric Co., N. Y.

Method of making aggregates of carbon black. No. 2,065,371. Herman Jacob Glaxner, Monroe, La., to Columbian Carbon Co., N. Y. City.

Catalytic production of formaldehyde from methyl alcohol with a catalyst which contains vanadium oxide and an oxide of a metal of the fifth or sixth groups of the periodic system. No. 2,065,394. Elton B. Punnett, Buffalo, N. Y., to National Aniline & Chemical Co., N. Y. City.

Chlorination of methyl ether and the products obtained therefrom. No. 2,065,400. Paul L. Salzberg and James H. Werntz to du Pont, all of Wilmington, Del.

Method of determining the lubricating properties of a liquid. No. 2,065,625. Elmer A. Sperry, Jr., to Sperry Products, Inc., both of Brooklyn, N. Y.

Method of crystallizing dextrose from a starch converted dextrose solution. No. 2,065,669. Charles Ebert, Leonia, N. J., and William B. Newkirk, Western Springs, Ill., to International Patents Development Co., Wilmington, Del.

Method of treating zinc oxide which comprises spraying with 0.1 to 1% by weight of a fatty acid, then screening to remove grit, etc., and aging the coated particles at 85° C in an atmosphere with a humidity of 40%. No. 2,065,687. Franklin B. Gearhart and Frederick A. Steele, Palmerton, Pa., to The New Jersey Zinc Co., N. J.

Method of producing by crystallization in a vacuum pan a high purity crystalline dextrose from a starch converted dextrose solution. No. 2,065,724. William B. Newkirk, Western Springs, Ill., to International Patents Development Co., Wilmington, Del.

Process for removing low molecular glycerides from polymerized oils by distillation. No. 2,065,728. Dirk Oosterhof, Haarlem, Cornelis van Vlodrop, Rotterdam, and Hein Israel Waterman, Delft, Netherlands, to Imperial Chemical Industries, Ltd., Gt. Brit.

Manufacture of alkali metal perborates by reacting a boric acid derivative of the group consisting of boric acid, boric anhydride and alkali metal borates in the solid state with an alkaline metal peroxide and a hydrogen peroxide solution. No. 2,065,744. Joseph S. Reichert, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Hydrogenated esters. No. 2,065,756. Norman D. Scott, Sanborn, N. Y., to du Pont, Wilmington, Del.

Method of making a cellular product by beating a mixture of a filler with an aqueous liquid containing sodium silicate solution to aerate it. No. 2,065,757. Walter M. Scott, Wellesley, Mass., to Elizabeth M. Carsley, Boston.

Method of extracting oil from vegetable or animal matter. No. 2,065,848. Raymond T. Anderson, Berea, Ohio, to The V. D. Anderson Co., Cleveland.

Brine recovery apparatus for water softeners. No. 2,065,962. Herbert L. Bowers, Long Island City, N. Y., to The Permutit Co. (1934), Wilmington, Del.

Protective composition comprising a dispersion of halogenated angular annelid hydrocarbon containing the phenanthrene group and rubber. No. 2,066,002. Ernest R. Hanson, Bloomfield, N. J., to Halowax Corp., N. Y. City.

Method of fortifying and purifying commercial barium peroxide. No. 2,066,015. James B. Pierce, Jr., to Barium Reduction Corp., both of Charleston, W. Va.

Metallic orthogermanate activated by a metal which gives to the combination the characteristics of becoming luminescent upon excitation. No. 2,066,044. Humboldt W. Leverenz, Collingswood, N. J., to Radio Corp. of America, N. Y. City.

Manufacture of a pigment conjointly with alkali metal hydroxide by the reaction of previously slaked lime containing magnesia with a causticizable alkali metal salt in the presence of water. No. 2,066,066. Arthur Minard Brooks and Harold Robert Rafton, Andover, Mass., to Raffold Process Corp., Mass.

Method of making a calcium sulfate-titanium dioxide pigment. No. 2,066,074.. Lonnie W. Ryan, Westfield, and Winfred Joseph Cauwenberg, Elizabeth, to United Color & Pigment Co., Newark, N. J.

Batch process for making coke. No. 2,066,083. James N. Vandegrift and Carl Postel to Coal Products Co. of Del., all of N. Y. City.

Method of extracting soluble titanium compounds from titanium ore. No. 2,066,093. Winfred Joseph Cauwenberg, Elizabeth, N. J., to United Color & Pigment Co., Newark.

Process for producing oxygen-enriched mixtures from air. No. 2,066,115. Richard Linde, Hollriegeiskrouth by Munich, Ger., to Union Carbide and Carbon Corp., N. Y.

Filtration of starch converted sugar solutions. No. 2,066,141. Charles J. Copland, North Kansas City, Mo., to International Patents Development Co., Wilmington, Del.

Catalytic composition and process for preparing same. No. 2,066,153. Wilbur A. Lazier, Marshallton, to du Pont, Wilmington, Del.

Method of making sodium aluminate which includes the treating of an aluminum-bearing earth with caustic liquor. No. 2,066,209. David Lurie, Joliet, Ill., to American Cyanamid & Chemical Corp., N. Y. City.

Process for the activation of bentonites. No. 2,066,212. Elmore McKellar one-half, to Reginald Roderick Cooper both of Winnipeg, Manitoba, Can.

Removal of sulfur and gummy matter from petroleum distillates by contacting the superheated vapors with cuprous oxide briquetted with linseed oil. No. 2,066,213. William C. Merchant, Everett, Mass.

Soybean compound for aging grain distillate. No. 2,066,263. John T. Finley, Chicago, to Archer-Daniels-Midland Co., Del.

Filter material and method of making same. No. 2,066,271. Chester M. Irwin, Milwaukee, to Whyt-Rox Chemical Co., Wauwatosa, Wis.

Process of improving carbon black by reducing the oil absorption without lowering tinctorial value which comprises subjecting it to attrition in a non-oxidizing atmosphere at elevated temperatures. No. 2,066,274. Walther H. Grote, Charleston, W. Va., to United Carbon Co., Md.

Stabilization of gilsonite by mixing molten gilsonite with powdered magnesium silicates and casein followed by addition of salt and raw sugar to the resultant mixture. No. 2,066,289. William Hassard, Vancouver, British Columbia, Can.

Moisture resisting composition for wood and the like. No. 2,066,295. Frank H. Lyons, Milwaukee, Wis., to E. L. Bruce Co., Memphis, Tenn.

Preparation of a polymer of chloro-2-butadiene-1, 3. No. 2,066,329. Wallace H. Carothers, Arnold M. Collins, and James E. Kirby to du Pont, all of Wilmington, Del.

Process for partially polymerizing chloro-2-butadiene-1, 3 in the presence of certain classes of vinyl compounds. No. 2,066,330. Wallace H. Carothers and Arnold M. Collins, Wilmington, and James E. Kirby, Arden, Del., to du Pont, Wilmington, Del.

Process for partially polymerizing chloro-2-butadiene-1, 3. No. 2,066,331. Wallace H. Carothers and Arnold M. Collins, Wilmington, and James E. Kirby, Arden, Del., to du Pont, Wilmington, Del.

Method of manufacturing tridymite stone. No. 2,066,365. Hermann Salmang and Benno Wentz, Aachen, Ger.

Method of making silica stone material which consists in burning a mixture of raw silica material, lime, and a frit containing an alkali oxide and a metallic oxide. No. 2,066,366. Hermann Salmang and Benno Wentz, Aachen, Ger.

Match having a non-combustible fibrous match splint body. No. 2,066,399. Harold W. Greider, Wyo., and Marion F. Smith, Cincinnati, to The Philip Carey Mfg Co., Ohio.

Process of making asphaltic storage battery cases. No. 2,066,459. Edward R. Dillehay, Glen Ellyn, Ill., to The Richardson Co., Lockland, Ohio.

Compression ignition fuel comprising a high boiling fuel oil containing monoethyl ether of glycerol dinitrate. No. 2,066,506. Clifford A. Woodbury, Media, Pa., and Walter E. Lawson, Wilmington, to du Pont, Wilmington, Del.

Hydrogenation process for producing hydroxy acids and lactones. No. 2,066,533. Wilbur A. Lazier, Marshallton, Del., to du Pont, Wilmington, Del.

Refractory starting material comprising chromite, spinel, and mullite. No. 2,066,543. Gilbert E. Seil, Cynwyd, Pa., to E. J. Lavino and Co., Philadelphia.

Method of decomposing acid sludge to produce sulfur dioxide and solid carbonaceous residue. No. 2,066,562. Theodore V. Fowler, Pelham, N. Y., to General Chemical Co., N. Y. City.

Method of making formaldehyde which comprises mixing ethylene with air and passing over a molybdenum oxide catalyst on a silica base gel.

No. 2,066,622. Rudolph L. Hasche, Whitefish Bay, Wis., to A. O. Smith Corp., Milwaukee.

Process for manufacture of water gas. No. 2,066,670. Hiram J. Carson, Cedar Rapids, Iowa.

Process of recovering sulfuric acid from separated sludge acid. No. 2,066,685. Ingenuin Hechenbleikner and Frank J. Bartholomew to Chemical Construction Corp., all of Charlotte, N. C.

Method of sterilizing and filtering using a cement clinker impregnated with copper and silver nitrates. No. 2,066,710. Atilio Antonio Manuel Bado, Buenos Aires, Argentina.

Method of producing sulfur dioxide gas mixture substantially free from hydrocarbons from an acid sludge resulting from the treatment of hydrocarbon oils with sulfuric acid. No. 2,066,774. Theodore V. Fowler, Pelham, N. Y., and Henry F. Merriam, West Orange, N. J., to General Chemical Co., N. Y. City.

Method of settling inorganic mineral slimes by treating them with sulfonated glyceride. No. 2,066,778. Abraham M. Herbsman, Huntington Park, Calif., to Industrial Patents, Ltd., Los Angeles.

Method of making reduction products of sulfuric acid. No. 2,066,896. Henry F. Merriam, West Orange, N. J., to General Chemical Co., N. Y. City.

Halogenated methyl ethers. No. 2,066,905. Harold S. Booth, Cleveland Heights, Ohio, to Westinghouse Electric & Mfg. Co., East Pittsburgh.

Process for making cork insulation by heating granulated cork in a mold until the natural resins are set free, compressing and allowing to cool. No. 2,066,988. Louis R. Lee, Rohrerstown, Pa., to Armstrong Cork Co., Lancaster, Pa.

Process for concentrating, by evaporation, liquids such as distiller's spent wash, steep water and press water of starch factories which prevents carmelization, etc. No. 2,067,002. Alfred Pollak, Woodmere, N. Y.

Process for producing disodium imidodicarboxylate by heating dry sodium carbonate to a temperature not exceeding 190° C. in a dry atmosphere. No. 2,067,013. Robert B. MacMullin, Niagara Falls, to The Mathieson Alkali Works, N. Y. City.

Method of producing sulfur dioxide by roasting finely divided metal oxides. No. 2,067,027. Charles Forbes Silsby, White Plains, N. Y., to General Chemical Co., N. Y. City.

Vacuum crystallizer and method of crystallizing. No. 2,067,043. Harold B. Caldwell, N. Y. City, to Swenson Evaporator Co., Harvey, Ill.

Carbureted water gas process. No. 2,067,052. John S. Haug and Harutyun G. Terzian, Philadelphia, and Joseph A. Perry, Swarthmore, Pa., to The United Gas Improvement Co., Philadelphia.

Method of coating pigments with dispersing agents. No. 2,067,060. Henry R. Minor, Oak Park, Ill., to Industrial Process Corp., Saratoga Springs, N. Y.

A coated single piece liner for use in container cap closures. No. 2,067,066. Clifton F. Schmidt, Jr. and George L. Ball, Pittsburgh.

Halogenated polymer of an alpha, gammadiene containing a single halogen atom in the molecule. No. 2,067,172. Wallace Hume Carothers, Fairville, Pa., to du Pont, Wilmington, Del.

Production of amino alcohol derivatives. No. 2,067,176. Henry Dreyfus, London, Eng.

Process of desiccating whole milk and cream and other fatty liquids deteriorating in temperatures in excess of 145° F. No. 2,067,205. Floyd W. Robison and Geoffrey D. Elmer, both of Detroit.

Method of producing crystallized anhydrous sodium metasilicate. No. 2,067,227. Chester L. Baker, Berkeley, Calif., to Philadelphia Quartz Co., Philadelphia.

Pigmented granular polymers. No. 2,067,234. Wallace E. Gordon, Wilmington, and Winfield W. Heckert, Ardentown, Del., to du Pont, Wilmington.

Process of making bituminous materials. No. 2,067,264. Alfred R. Ebberts, N. Y. City, to Colprovia Roads, Inc., N. Y. City.

Process of removing ammonia and hydrogen sulfide from a gas containing the same. No. 2,067,311. Hans Baehr, Leuna, to I. G., Frankfort, Ger.

Method of converting barbituric acids into stable aqueous solutions. No. 2,067,317. Heinrich Gruber, Schoneberg, Ger.

Manufacture of aqueous solutions from substituted barbituric acids. No. 2,067,318. Heinrich Gruber, Schoneberg, Ger.

Product comprising tobacco and sorbitol. No. 2,067,338. James T. Power, Wilmington, Del., and Kenneth R. Brown, Tamaqua, Pa., to Atlas Powder Co., Wilmington.

Process and apparatus for separating gas mixtures. No. 2,067,349. Paul Schuftan, Hoellriegelskreuth, near Munich, Ger., to The Linde Air Products Co., Ohio.

Purification of sugar juices. No. 2,067,362. George E. G. von Stietz, Berkeley, Calif., to Shell Development Co., San Francisco.

Process for producing hydrogen peroxide from a solution of persulfuric acid or a persulfate. No. 2,067,364. Isaac Ephraim Weber and Victor Wallace Slater, Luton, Eng., to du Pont, Wilmington, Del.

Hydrogenation catalyst and its preparation. No. 2,067,368. Evan Clifford Williams and Sumner H. McAllister, Berkeley, Calif., to Shell Development Co., San Francisco.

Method which comprises heating a mixture of isobutyl chloride, water, and a metal base to a reaction temperature above 100° C at superatmospheric pressure and thereafter separating isobutylene, isobutyl alcohol, and tertiary butyl alcohol from the reacted mixture. No. 2,067,473. Edgar C. Britton, Gerald H. Coleman, and Garnett V. Moore, to The Dow Chemical Co., all of Midland, Mich.

Method of polymerizing derivatives of acrylic and methacrylic acid to produce thin bubble free slabs. No. 2,067,580. Otto Rohm, Darmstadt, Ger., to Rohm & Haas Co., Philadelphia.

Process for softening water and dissolving calcium salts with thiotetraphosphates. No. 2,067,628. Augustus H. Fiske, Warren, and Charles S. Bryan, Providence, R. I., to Rumford Chemical Works, Rumford, R. I.

Mercury compound obtainable by the reaction of a double iodide of mercury and a compound belonging to the group consisting of a glycol and a glycol-ether. No. 2,067,674. Harold B. Kimerlin, N. Y. City.

Polymerization products. No. 2,067,706. Hans Fikentscher, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Catalyst for promoting the reaction between a hydrocarbon and steam comprising chromium oxide and an oxide of molybdenum and containing substantially no nickel, iron, or cobalt. No. 2,067,729. Frank Porter, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Method of treating carbonaceous electrode elements. No. 2,067,738. Masutaro Suzuki, Oji-ku, to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan.

Process of manufacturing calcined gypsum which comprises calcining gypsum and adding ammonium acetate before the completion of the calcining operation. No. 2,067,762. Gilbert A. Hoggatt, Buffalo, N. Y., to Certain-Teed Products Corp., N. Y. City.

Method of deodorizing plastic polymerized chloroprene by treating thin sheets of it with ethyl alcohol or other solvents for the malodorant materials. No. 2,067,854. Alexander D. MacDonald, Malden, Mass., to B. B. Chemical Co., Boston.

Alkali metal salts of chloroethane sulfonic acid. No. 2,067,873. Edgar C. Britton and Ralph P. Perkins to The Dow Chemical Co., all of Midland, Mich.

Aromatic mercury salts of an oxygen acid of a halogen. No. 2,067,894. Carl N. Andersen, Wellesley Hills, Mass., to Lever Brothers Co., Me.

Process for freeing the pigment from suspension in a water pulp. No. 2,067,906. Henry Dourif, Huntington, W. Va.

Process for forming mirrors by the condensation of magnesium and aluminum vapors on a reflector body. No. 2,067,907. Hiram W. Edwards, Los Angeles, to Don Baxter, Inc., Glendale, Calif.

Process comprising reacting cashew nut shell liquid and from about 1% to about 5% of its volume in concentrated sulfonic acid. No. 2,067,919. Mortimer T. Harvey, East Orange, and Frederick M. Damitz, Ocean Grove, N. J., to The Harvel Corp., N. J.

Process for purifying film scrap or other cellulose esters containing a colloiding agent such as camphor. Nos. 2,067,937 and 2,067,938. Dorman McBurney, Newburgh, N. Y., and Edgar H. Nollau, Wilmington, to du Pont, Wilmington, Del.

Process for recovering sulfuric acid and of making adsorptive carbon from dilute aqueous sulfuric acid containing soluble organic matter of a petroleum origin. No. 2,067,985. Neil A. Sargent, Woburn, Mass., to Monsanto Chemical Co., Del.

Preparation of antimony trifluoride. No. 2,068,005. Herbert Wilkens Daudt and Mortimer Alexander Youker, Wilmington, and Edwin Lorenzo Mattison, Richardson Park, Del., to Kinetic Chemicals, Wilmington, Del.

Method of polymerizing olefins. No. 2,068,016. Frederick H. Gayer to General Motors Corp., both of Detroit.

Manufacture of pigment calcium carbonate magnesium basic carbonate by the reaction of carbon dioxide on calcium carbonate magnesium hydroxide. No. 2,068,039. Harold Robert Rafton, Andover, Mass., to Raffold Process Corp., Mass.

Production of monomethylamine and dimethylamine. No. 2,068,132. Paul Herold and Karl Smeykal, Leuna, Ger., to I. G. Frankfort, Ger.

Process of purifying and fractionating mahogany sulfonates and products thereof. No. 2,068,149. Latimer D. Myers and Lou A. Stegemeyer, to The Twitchell Process Co., all of Cincinnati.

Tear gas cartridge. No. 2,068,159. Peter von Frantzius to Hercules Gas-Munitions Corp., both of Chicago.

Electrical insulation comprising fibers of the type of chrysotile asbestos and the insoluble product of the reaction of a water-soluble soap with the said fibers. No. 2,068,208. Bailey Townshend, Westfield, N. J., to Johns-Manville Corp., N. Y. City.

Water-resistant composition comprising fibers from the group consisting of chrysotile asbestos, tremolite, activated crocidolite and activated amosite coated with an insoluble soap. No. 2,068,219. Marion S. Badollet, Fanwood, N. J., to Johns-Manville Corp., N. Y. City.

Process for the manufacture of carbureted water gas with heavy oil. No. 2,068,245. Joseph A. Perry, Swarthmore, Pa., to The United Gas Improvement Co., Philadelphia.

Vapor phase catalytic process for the production of aliphatic acids from compounds containing at least one alkoxy group and carbon monoxide. No. 2,068,265. Gilbert B. Carpenter, Framingham, Mass., and Wallace H. Carothers, Fairville, Pa., to du Pont, Wilmington, Del.

Method for the production of derivatives of cyclic β — Keto carboxylic acids. No. 2,068,284. Karl Ziegler, Heidelberg, Ger., to Schering-Kahlbaum A. G., Berlin, Ger.

Inorganic colored pigment and a process of preparing the same. No. 2,068,294. Erich Korinth, Frankfort, and Georg Meder, Munster-in-Taunus, Ger., to I. G., Frankfort, Ger.

Method of making a refractory of high density from anhydrous nonplastic material and a bonding substance. No. 2,068,411. Russell P. Heuer, Bryn Mawr, Pa., to General Refractories Co., Pa.

Method of purifying phenylethyl alcohol by forming a non-volatile ester, removing impurities by vacuum distillation and hydrolyzing the ester and recovering the alcohol. No. 2,068,415. Kenneth H. Klipstein, Short Hills, N. J., to The Calco Chemical Co., Bound Brook, N. J.

Production of vinyl halide polymerization products. No. 2,068,424. Hermann Mark, Vienna, Austria, and Hans Fikentscher, Josef Hengstenberg, and Georg V. Susich, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Method of producing sulfur from sulfide ores. No. 2,068,430. Thomas C. Oliver, Great Neck, N. Y., to Chemical Construction Corp., N. Y. City.

Ascorbic acids and methods of making same. No. 2,068,453. Burckhardt Helferich, Leipzig, and Otto Peters, Oker, Ger.

Method of coloring calcareous stone. No. 2,068,483. Clarence E. Cleveland and Vincent E. Peterson, Salina, Kans.

Method of reducing the dustiness of coal, coke, etc., by spraying with glycerine "foots." No. 2,068,489. Benjamin R. Harris, Chicago.

Rectifier element. No. 2,068,557. Maurice Masnou, Paris, Fr., to General Electric Co., N. Y.

Stabilized alkyl halide and process of stabilization. No. 2,068,607. John F. Olin to The Sharples Solvents Corp., both of Philadelphia.

Colored compound derived from the yellow oxidation ferment from animal or vegetable cell matter. No. 2,068,623. Otto Warburg, Berlin-Dahlem, to Schering-Kahlbaum A. G., Berlin, Ger.

Preparation of cellulose xanthate solutions. No. 2,068,631. George A. Richter to Brown Co., both of Berlin, N. H.

Leather and Tanning, Artificial Leather

Manufacture of a leather substitute from fabric and a fiber laden rubber compound. No. 2,065,892. Albert J. Hanley to Respro, Inc., both of Cranston, R. I.

Metals and Ores, Electroplating, etc.

Process for extracting beryllium from beryl by increasing the chemical reactivity of the beryl by heating above 1000° C., cooling and extracting the modified beryl. No. 20,214. Charles B. Sawyer and Bengt Kjellgren, to The Brush Beryllium Co., all of Cleveland.

Method for separating cadmium from cadmium-zinc ores. No. 2,064,835. Reed W. Hyde, Summit, N. J.

Froth flotation of ores using as a frother a saturated hydrocarbon mixture and an aliphatic alcohol having from 7 to 10 carbon atoms. No. 2,065,053. Ludwig J. Christmann, Jersey City, and David W. Jayne, Jr., Elizabeth, N. J., to American Cyanamid Co., N. Y. City.

Bath to be used in electrodepositing copper comprising .10 to .50 oz. copper, .25 oz. free alkali cyanide, .90 oz. sodium citrate or salt containing citrate, .007 oz. of aluminum or metal of that group, .25 oz. sulfate compound, .50 oz. of sodium hydroxide or its equivalent, in one gallon of water. No. 2,065,082. Bernard F. Lewis to Northwest Chemical Co., both of Detroit.

Magnesium alloy containing 14-18% aluminum, 0.1-1% silicon, 3-8% antimony, 2-5% nickel, 0.05-0.5% chromium, 0.1-1% manganese, 0.05-0.5% molybdenum, 6-8% copper, 0.1-2% titanium, the rest magnesium. No. 2,065,170. Fritz Christen, Zurich, Switz.

Method of manufacturing metallic fumes, oxides, etc. No. 2,065,218. Claude F. Garesche, South Orange, N. J., to National Lead Co., N. Y. City.

Method of producing sheet metal suitable for subsequent enameling. No. 2,065,392. Rudyard Porter, Minneapolis, and Raymond B. Saylor, Oakmont, Pa., to American Sheet and Tin Plate Co., N. J.

Method of producing antimony free lead oxide from an oxidic lead material containing antimony. No. 2,065,408. Svend S. Svendsen, Madison, Wis., to Basic Metals Corp., Chicago.

Aluminum copper alloy made by melting together a mixture of aluminum and 3 to 15% copper and incorporating in the molten alloy a material containing tin chloride. No. 2,065,534. Alfred J. Lyon, Dayton, Ohio.

Method of treating gold-bearing ores containing sulfides. No. 2,065,547. Craig R. Arnold, Dahlonega, Ga.

Method of roasting finely divided sulfide ore and producing sulfur dioxide. No. 2,065,563. Bernard M. Carter, Montclair, and Henry F. Merriam, West Orange, N. J., to General Chemical Co., N. Y.

Formation of substantially pure porous iron by the reduction of briquettes composed of iron oxide and a small amount of carbon. No. 2,065,618. Charles Frederic Sherwood, Chicago, to John A. Dienner, Evanston, Ill., thirty-five per cent., and sixty-five per cent. to Hansen Rubber Products Co., Del.

Method of condensing magnesium vapors from gaseous mixtures. No. 2,065,709. Frank R. Kemmer, Larchmont, N. Y., to American Magnesium Metals Corp., Pittsburgh, Pa.

Electrodes for luminous tubes containing an inert gas, said electrodes consisting of copper with an inner surface layer of cuprous oxide and an outer surface layer of cupric oxide. No. 2,065,947. Raymond Nauth, Buffalo, to Flexlume Corp., N. Y.

Method of producing a casting whose main body is a copper base alloy and whose surface is composed of 20 to 40% copper, 40 to 12% chromium, 10 to 30% silicon, up to 30% iron and up to 5% carbon. No. 2,066,054. William J. Priestley, New Rochelle, N. Y., to Union Carbide and Carbon Corp., N. Y.

Production of protective or paint holding coatings on aluminum and its non-cuprous alloys. Nos. 2,066,180 and 2,066,181. Edwin Cecil Frederick King, Brentford-Middlesex, Eng., to Pyrene Mfg. Co., Newark, N. J.

Bath for the anodic treatment of aluminum and its alloys comprising 5% chromic acid and 5% to 11% chromium acetate. No. 2,066,327. Robert W. Buzzard, Kensington, Md.

Production of nickel by electrolytic deposition from nickel salt solutions. No. 2,066,347. Anton Martin Gronningsaeter, N. Y. City, to Falconbridge Nickel Mines, Ltd., Toronto, Ontario, Can.

Thermal treatment of light metals and light metal alloys in molten salt baths. No. 2,066,454. Klaus Bonath and Carl Albrecht, Kronberg in Taunus, Ger., to Deutsche Gold und Silber Scheideanstalt vormals Roessler, Frankfort, Ger.

Alloy containing up to 1.67% phosphorus, up to 5% iron and the balance copper. No. 2,066,512. Robert S. Archer, Evanston, Ill., to A. O. Smith Corp., Milwaukee, Wis.

Method of casting magnesium. No. 2,066,564. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh.

Method of refining magnesium and magnesium alloys. No. 2,066,579. Georg Schichtel, Dobriach-on-Millstattersee, Austria, to American Magnesium Metals Corp., Pittsburgh.

Selenium cell. No. 2,066,611. Andrew Christy to G-M Laboratories, Inc., both of Chicago.

Process for the recovery of iron from iron ores. No. 2,066,665. Thaddeus F. Baily, Canton, Ohio.

A method of coating magnesium surfaces by treating with a 1% oxalic acid solution at approximately boiling temperature. No. 2,066,-842. Herman J. Lodeesen to The Patents Corp., both of Detroit.

Chill cast iron alloy roll. No. 2,066,848. Paul D. Merica, N. Y. City, and James S. Vanick, Elizabeth, and Thomas H. Wickenden,, Roselle, N. J., to The International Nickel Co., N. Y. City.

Alloy composed of 25 to 65% rhodium and the balance nickel which is resistant to corrosion by writing fluids. No. 2,066,870. Edmund M. Wise, Westfield, and Raymond F. Vines, Elizabeth, N. J., to The International Nickel Co., N. Y. City.

Magnetic iron alloy containing 15 to 25% nickel, 6 to 15% beryllium, 3 to 5% cobalt, and the balance iron. No. 2,066,911. Robert A. Curry to Indiana Steel Products Co., both of Chicago.

Magnetic iron alloy containing 15 to 25% nickel, 0.25 to 2% beryllium, 1 to 10% cobalt and the balance low carbon iron. No. 2,066,926. Robert A. Curry to Indiana Steel Products Co., both of Chicago.

Process of acid treating oil and removing the acid from the acid reaction products. No. 2,066,933. Earle W. Gard, Palos Verdes Estates, Calif., to Union Oil Co. of California, Los Angeles.

Composition for sealing and coating metal surfaces comprising boiled castor oil having a grease-like consistency, a filler, and a non-drier. No. 2,066,958. Henry Lowe Brownback, Norristown, Pa.

Method of recovering the iron and gold content of metallic sulfide ores. No. 2,067,006. Craig Ritchie Arnold, Dahlonega, Ga.

Cyanidation and flotation of precious metal ores. No. 2,067,014. Jephthah M. Morris, Baguio, P. I., to Benguet Consolidated Mining Co., S. A., Manila, P. I.

A heat treating and rolling process for improving the electrical and magnetic properties of a steel containing 0.5% to 5% silicon. No. 2,067,036. Anton Wimmer, Dortmund, Ger.

Tantalum carbide alloy. No. 2,067,166. Clarence W. Balke, Highland Park, Ill., to Ramet Corp. of America, North Chicago, Ill.

Process for purification and refinement of magnesium and magnesium alloys consisting in treating the said material in the molten with hydrogen peroxide. No. 2,067,275. Alexander Luschenowsky, Berlin, Ger.

Stainless so-called white metal containing 65-93% copper, 4 to 25% nickel, with the sum of the copper and nickel between 80 to 97%, 0.5 to 5% chromium, 0.5 to 5% manganese, and 2 to 15% iron, but at least twice as much iron as chromium. No. 2,067,306. Richard A. Wilkins to Revere Copper and Brass Inc., both of Rome, N. Y.

Stainless copper base alloy. Nos. 2,067,307 and 2,067,308. Richard A. Wilkins to Revere Copper and Brass, Inc., both of Rome, N. Y.

An electrolytic process for separating iron from mercury. No. 2,067,-361. Robert E. Vivian, Garden City, N. Y., to General Chemical Co., N. Y. City.

Method of alloying with lead free of alkaline metals, another metal of higher melting point. No. 2,067,507. George O. Smith, East Orange, N. J., to Bell Telephone Laboratories, N. Y. City.

An electrolyte for depositing rhodium, made by dissolving rhodium ammonium nitrate in an acid solution. No. 2,067,534. Christian William Keitel, West Orange, N. J., to Baker & Co., Newark, N. J.

Alloys to be used in manufacture of heat resisting articles. No. 2,067,569. Werner Hessenbruch to Heraeus-Vacuumschmeize A. G., both of Hanau-on-the-Main, Ger.

Welding rod comprising a ferrous metal body containing columbium and a coating containing 1 to 50% metallic silicon. No. 2,067,630. Russell Franks, Jackson Heights, N. Y., to Union Carbide and Carbon Corp., N. Y.

Welding rod containing 12-30% chromium, 5-30% nickel, 0.01 to 0.3% carbon, 0.1 to 3% columbium, the columbium content being at least 8 times the carbon content; 0.7% silicon, and the balance iron. No. 2,067,631. Frederick M. Becket, N. Y., and Russell Franks, Jackson Heights, N. Y., to Union Carbide and Carbon Corp., N. Y.

Process for treatment of aluminum electrodes which are to be used in electrolytic devices. No. 2,067,703. Preston Robinson and Joseph L. Collins, North Adams, to Sprague Specialties Co., Quincy, Mass.

An alkaline electrolyte for plating rhodium obtained by dissolving ammonium rhodium nitrite in ammonia. No. 2,067,747. Fritz Zimmermann to Baker & Co., both of Newark, N. J.

Water soluble complex of rhodium and nitrite united with ammonium. No. 2,067,748. Fritz Zimmermann to Baker & Co., both of Newark, N. J.

Method of treating complex lead bearing ore materials. No. 2,067,778. Thomas A. Mitchell, Inglewood, Calif., to Hughes-Mitchell Processes, Denver, Colo.

Treatment of iron ores containing nickel. No. 2,067,874. Earl H. Brown and Sylvester James Broderick, Yellow Springs, Ohio, to Bethlehem Mines Corp., Del.

Process for precipitation of copper from its solutions by treating with nickel. No. 2,068,296. Fritz Lausberg, Dusseldorg-Oberkassel, Ger., to Firma Dr. Kurt Albert G. m. b. H., Neuss, Ger.

Process for melting a difficultly fusible alloy ingredient containing carbon and for incorporating it into a molten bath of base metal having a lower melting point than the alloy ingredient. No. 2,068,322. Charles Hardy, Pelham Manor, N. Y., to Charles Hardy, Inc., N. Y. City.

Naval Stores and Derivatives

Coating composition including as ingredients pentaerythrite abietate, a drying oil and a nitrated carbohydrate. No. 2,066,759. Leavitt N. Bent, Holly Oak, Del., to Hercules Powder Co., Wilmington, Del.

Paper and Pulp

Apparatus for bleaching pulp with chlorine. No. 2,065,387. Mathew F. McCombs and Francis W. Decker to Niagara Alkali Co., all of Niagara Falls, N. Y.

Chemical process for producing pulp from raw cellulosic material. No. 2,065,396. George A. Richter to Brown Co., both of Berlin, N. H.

Production of pulp by treating fibrous material under pressure with a bisulfate liquor followed by treating with an alkaline liquor. No. 20,217. Thomas Leonidas Dunbar to Chemipulp Process, Inc., both of Watertown, N. Y.

Method of coating and ornamenting paper and the like. No. 2,065,925. Alan M. Overton, Wyoming, and Harry C. Fisher, Cincinnati, to The Richardson Co., Lockland, Ohio.

Method of producing paper tubes and pipes using a thermoplastic solidifiable adhesive. No. 2,066,991. Alfred Lutz, Bredereiche, Ger.

Vegetable parchment paper and method of making same. No. 2,067,501. John A. Newman, Edgeley, Pa., to Paterson Parchment Paper Co., Bristol, Pa.

Process for paper manufacture which involves the cooking of a fibrous material with an alkaline medium and a minor amount of turpentine. No. 2,068,151. Raymond F. Remler, Lakewood, Ohio, to du Pont, Wilmington, Del.

Process for producing paper products. No. 2,068,299. George J. Manson, Hawkesbury, Ontario, Can., one-half to Nathaniel L. Foster, N. Y. City.

Cast substantially transparent cellulose base film containing a small proportion of mechanically gelatinized cellulose pulp to increase the tear resistance. No. 2,068,630. George A. Richter, to Brown Co., both of Berlin, N. H.

Petroleum and Petroleum Derivatives

Process for producing motor fuel from a crude oil containing natural gasoline. No. 2,064,816. Otto Behimer to Universal Oil Products Co., both of Chicago.

Conversion of hydrocarbon oils. No. 2,064,834. Lyman C. Huff to Universal Oil Products Co., both of Chicago.

Cracking process for producing anti-knock motor fuel from paraffinic oil. No. 2,064,842. Charles D. Lowry, Jr., and Felix J. Skowronski to Universal Oil Products Co., all of Chicago.

Cracking process for the conversion of hydrocarbon oils. No. 2,064,-846. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Method for treating gaseous hydrocarbons to convert them into liquid hydrocarbons. No. 2,064,847. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

A method of simultaneously desulfurizing and fractionating petroleum oils involving the use of lime and a metallic oxide. No. 2,064,999. Cornelius B. Watson to The Pure Oil Co., both of Chicago.

Method of separating asphaltic matter from asphaltic petroleum stock which involves a hydrogenation process. No. 2,065,201. Antoni Szayna, Lwow, Poland, to Sinclair Refining Co., N. Y. City.

Process for inhibiting gum formation in a cracked petroleum distillate motor fuel. No. 2,065,249. John P. Smoots to The Standard Oil Co. (Ohio), both of Cleveland.

Process for rendering inert the calcium compounds in a petroleum stock to which lime has been added during processing by the addition of acid oil separated from an acid sludge. No. 2,065,281. Albert J. Kraemer, Washington, D. C.

Conversion of hydrocarbon oils. No. 2,065,351. LeRoy G. Story,, Bronxville, to The Texas Co., N. Y. City.

Process for the treatment of hydrocarbon oil. No. 2,065,470. Percival C. Keith, Jr., Peapack, N. J., to Gasoline Products Co., Newark, N. J.

Selectively polymerizing isobutylene from mixtures containing it by reacting it and an olefine with boron fluoride. No. 2,065,474. Martin

Mueller-Cunradi and Michael Otto, Ludwigshafen-on-the-Rhine, to I. G., Frankfort, Ger.

Preparation of esters by reacting secondary olefines having at least 3 carbon atoms with carboxylic acid in presence of a motivating agent. No. 2,065,540. Helmuth G. Schneider, Elizabeth, N. J., to Standard Oil Development Co., Del.

Method of synthesizing from a gas oil a high viscosity index lubricating oil resistant to oxidation. No. 2,065,551. Leslie C. Beard, Jr., Brooklyn, to Socony-Vacuum Oil Co., N. Y.

Compression ignition fuel comprising a high boiling oil of the Diesel type and a primer selected from the lower alkyl nitrates and nitrites and a second primer consisting of benzyl bromide, the fuel containing 0.5-5.0% by weight of each primer. No. 2,065,588. Donald Albert Howes, Norton-on-Tees, Eng., to Imperial Chemical Industries, Ltd., Gt. Brit.

Method of decarbonization and concentration. No. 2,065,617. Howard W. Sheldon, Haddonfield, N. J., to Socony-Vacuum Oil Co., N. Y. City.

Method of purification of used crankcase oil. No. 2,065,619. Vincent G. Shinkle to Motor, Inc., both of N. Y. City.

Process of revivifying and reactivating used solid inorganic refining agents. No. 2,065,643. David G. Brandt, Westfield, N. J., to Doherty Research Co., N. Y. City.

Process for cracking hydrocarbon oils. No. 2,066,097. John Cutter, Tulsa, Okla., to Universal Oil Products Co., Chicago.

Apparatus for the stabilization of hydrocarbon oils. No. 2,066,100. Howard Dimmig, N. Y. City, to Gasoline Products Co., Newark, N. J.

Process for purifying and dewaxing mineral oils. Nos. 2,066,164 and 2,066,165. George J. Strezynski, Poughkeepsie, N. Y., to The DeLaval Separator Co., N. Y. City.

Process for treating a cold mixture of acid sludge, oil, and wax to recover refined lubricating oil, crystalline wax and petrolatum. No. 2,066,166. George J. Strezynski, Poughkeepsie, N. Y., and George M. Pfau, Fort Worth, Tex., to The DeLaval Separator Co., N. Y. City.

Conversion of mercaptans to thioethers by contacting them at a suitable temperature with a catalyst comprising a sulfide of the group zinc, tin, bismuth, aluminum, and iron. No. 2,066,189. William Seaman, Glens Falls, N. Y., and John R. Huffman, Elizabeth, N. J., to Standard Oil Development Co., Del.

Preparation of olefinic thioethers. No. 2,066,191. Luther B. Turner, Elizabeth, N. J., to Standard Oil Development Co., Del.

Salts of alkaloids formed by combining alkaloids with oil-soluble sulfonic acids derived from petroleum oil treated with concentrated sulfuric acid. No. 2,066,197. Hyym E. Buc, Roselle, N. J., to Standard Oil Development Co., Del.

Process for preparing Grignard compounds. No. 2,066,198. Hyym E. Buc, Roselle, N. J., to Standard Oil Development Co., Del.

Process for decolorizing a lubricating stock by treatment with sulfuric acid and percolation through coarse clay. No. 2,066,200. William A. Eberle, Jersey City, and Marion B. Hopkins, Elizabeth, N. J., to Standard Oil Development Co., Del.

Process of separating and recovering hydrocarbons and alkyl esters from mixtures thereof. No. 2,066,461. William Engs, Berkeley, to Shell Development Co., San Francisco.

Process for the fractionation of a system comprising lubricating oil, liquefied in normally gaseous hydrocarbon and an organic selective solvent. No. 2,066,686. Webster B. Kay to Standard Oil Co. (Ind.), both of Chicago.

Process for cracking hydrocarbon oils. No. 2,066,693. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Process for hydrogenating hydrocarbon oil. No. 2,066,697. Jean Delattre-Seguy to Universal Oil Products Co., both of Chicago.

Method of cracking hydrocarbon oils. No. 2,066,808. Pike H. Sullivan, New Rochelle, N. Y., to Gasoline Products Co., Newark, N. J.

Process for removing acid components from hydrocarbon distillates. No. 2,066,925. David Louis Yabroff, Oakland, and John Wilkinson Givens, Berkeley, to Shell Development Co., San Francisco.

Process for producing improved synthetic oil by the catalytic polymerization of a hydrocarbon mixture derived from a cracked gasoline distillate. No. 2,067,030. Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco.

Solvent extraction process for dewaxing lubricating oil. No. 2,067,050. Francis H. Govers, Vincennes, Ind., to Indian Refining Co., Lawrenceville, Ill.

Dewaxing lubricating oils. No. 2,067,128. Robert E. Manley, Beacon, N. Y., to The Texas Co., N. Y. City.

Solvent refining of mineral oil. No. 2,067,137. Louis A. Clarke, Fishkill, N. Y., to The Texas Co., N. Y. City.

Process for dewaxing oils which comprises passing a stream of oil between oppositely charged electrodes which cause wax particles to agglomerate. No. 2,067,162. Harmon F. Fisher and Blair G. Aldridge to Union Oil Co., all of Los Angeles.

Method of dewaxing petroleum stock which comprises selectively extracting the oil from the stock and cooling to precipitate the wax. No. 2,067,193. Leo D. Jones to The Sharples Specialty Co., both of Philadelphia.

Method of dewaxing mineral lubricating oil which comprises diluting with propane, chilling and filtering to remove wax. No. 2,067,198. Robert E. Manley, Port Arthur, Tex., to The Texas Co., N. Y. City.

Anti-knock motor fuel containing tetraethyl lead and a small amount of a water-soluble fluoride to stabilize the tetraethyl lead. No. 2,067,331. Josef Martin Michel, Bitterfeld, to I. G., Frankfort, Ger.

Method of producing a lubricating oil by polymerizing unsaturated hydrocarbons produced by vapor phase cracking. No. 2,067,334. Rudolph C. Osterstrom to The Pure Oil Co., both of Chicago.

Method of purifying oily materials which contain polar substances. No. 2,067,345. Claudius H. M. Roberts, San Marino, and Ralph L. Belshe, Long Beach, to Petroleum Rectifying Co. of Calif., Los Angeles.

Aliphatic secondary ether of a polyglycol. No. 2,067,385. Theodore W. Evans and Edwin F. Bullard, Berkeley, to Shell Development Co., San Francisco.

Treatment of unsaturated monohalides. No. 2,067,392. Herbert P. A. Groll, Oakland, and George Hearne, Berkeley, to Shell Development Co., San Francisco, Calif.

Process for the synthesis of olefine derivatives. No. 2,067,616. Richard Z. Moravec, Berkeley, Calif., to Shell Development Co., San Francisco.

Method for flashing mineral oils. No. 2,067,627. Merrell R. Fenske and Wilbert B. McCluer, State College, Pa., to Pennsylvania Petroleum Research Corp., Pa.

Separation and purification of aromatic and non-aromatic nitrogen bases. No. 2,067,704. James R. Bailey, Austin, Texas, to Union Oil Co., Los Angeles.

Cracking process for hydrocarbon oils. No. 2,067,730. Ralph H. Price, Galveston, Tex., and Rodney V. Shankland, Hammond, Ind., to Standard Oil Co., (Ind.) Chicago.

Process for improving the knock ratings of aromatic hydrocarbons when used as a motor fuel. No. 2,067,764. Vladimir Ipatieff to Universal Oil Products Co., both of Chicago.

Cracking process for the conversion of hydrocarbon oils. No. 2,067,782. Edwin F. Nelson to Universal Oil Products Co., both of Chicago.

Process for decolorizing viscous lubricating oil which comprises diluting the oil with liquid propane, decolorizing by passing through a bed of absorbent clay, and finally removing the propane by distillation. No. 2,067,802. Claude F. Tears, Mountain Lakes, N. J., to The Petroleum Processes Corp., Wichita, Kans.

Treatment of hydrocarbon oil. No. 2,067,810. Charles H. Angell to Universal Oil Products Co., both of Chicago.

Apparatus for converting higher boiling hydrocarbons into lower hydrocarbons. No. 2,067,832. Carbon P. Dubbs to Universal Oil Products Co., both of Chicago.

Process for treating heavy hydrocarbon oils for the production of gasoline and other products. No. 2,067,847. Wright W. Gary, Great Neck, N. Y., and John T. Ward, Westfield, N. J., to Gasoline Products Co., Newark, N. J.

Cracking process for the conversion of hydrocarbon oils. No. 2,067,865. LeRoy G. Story, Beacon, N. Y., to The Texas Co., N. Y. City.

Process of treating hydrocarbon oil for the production of relatively high anti-knock gasoline. No. 2,067,869. Harold V. Atwell, White Plains, N. Y., to Gasoline Products Co., Newark, N. J.

Process for generating hydrocarbon fixed gases from oil. No. 2,067,940. Theodore Nagel, Brooklyn, N. Y., to Carburetted Gas, Inc., Del.

Process for refining a heavy naphtha motor fuel stock. No. 2,068,126. Ogden Fitz Simons and Raymond A. Jack, Hammond, Ind., to Standard Oil Co. (Ind.), Chicago.

Motor fuel containing a small amount of a lubricating composition. No. 2,068,635. Carl F. Prutton, to The Lubri-Zol Development Corp., both of Cleveland.

Resins, Plastics, etc.

Air drying composition of the alkyd resin type. No. 2,064,875. Howard L. Bender, Bloomfield, N. J., to Bakelite Corp., N. Y. City.

Complex resinous condensation product formed from a polyhydric alcohol, a high molecular weight fatty acid, an inorganic acid of the group consisting of boric, telluric, phosphoric, arsenic and silicic, a dicarboxylic aliphatic acid and a phenol-aldehyde condensate. No. 2,064,950. Israel Rosenblum, Jackson Heights, N. Y.

Process and method for impregnating wood. No. 2,064,965. Heinrich Ernst Will, one-half to David Dominicus, Remscheid-Vieringhausen, Ger.

Method of coating wire with fibrous material containing phenol-formaldehyde condensation products. No. 2,065,561. William E. Boyle and Glenwood M. Van Lear, Madison, N. J., to Spaulding Fibre Co., Tonawanda, N. Y.

Catalytic production of vinyl esters by the action of acetylene on carboxylic acids. No. 2,066,075. Walter Reppe, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Catalytic production of vinyl esters from mixtures of acetylene and alcohol. No. 2,066,076. Walter Reppe and Werner Wolff, Ludwigshafen-on-the-Rhine, to I. G., Frankfort, Ger.

Manufacture of resin by subjecting a hydrocarbon distillate of approximately gasoline boiling range to the action of oxygen and a heavy metal oxide. No. 2,066,090. William B. Borst to Universal Oil Products Co., both of Chicago..

Manufacture of a resin by subjecting cracked petroleum oil to the action of an ozone containing gas at a temperature above 250° F and mixing the product with formaldehyde or a formaldehyde yielding substance. No. 2,066,120. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Preparation of n-vinyl compounds by reacting acetylene with pyrrole compounds in the presence of a substance of the group consisting of alkali metals, alkali metal hydroxides and alcoholates. No. 2,066,160. Walter Reppe and Ernst Keyssner, Ludwigshafen-on-the-Rhine, to I. G., Frankfort, Ger.

Method of producing sheets from urea formaldehyde resins. No. 2,066,726. Stefan Goldschmidt, Emil Gerisch, Wilhelm Beuschel, Karlsruhe, and Arthur Muller, to Thekla Muller, all of Berlin-Charlottenburg, Ger.

Method of transforming polymerized vinyl chloride into thin sheets and product obtainable thereby. No. 2,067,025. Fritz Schmidt, to Dynamit-Actien-Gesellschaft, vormals Alfred Nobel & Co., both of Troisdorf, Ger.

Synthetic resin formed from a pinene-maleic anhydride and an alcohol. No. 2,067,054. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Heat polymerization process for obtaining resins from reactives contained in a crude solvent naphtha. No. 2,067,073. William H. Carmody, Pittsburgh, to The Neville Co., Pa.

Polymerized vinyl resin coating material comprising a polymerized vinyl resin, a solvent, a diluent, and from 2 to 12% of a polyhydronaphthalene. No. 2,067,316. Daniel M. Gray to Hazel-Atlas Glass Co., both of Wheeling, W. Va.

Synthetic resin obtained by reacting a terpene hydrocarbon of the formula $C_{10}H_{16}$ and possessing no conjugate double bonds, maleic anhydride, and a compound containing the abietyl radical. No. 2,067,859. Ernest G. Peterson, to Hercules Powder Co., both of Wilmington, Del.

Synthetic resin obtained as a reaction product of a polyhydric alcohol, an organic polybasic acid or anhydride and a hydrogenated abietyl alcohol. No. 2,067,862. Alfred L. Rummelsburg to Hercules Powder Co., both of Wilmington, Del.

Powdered molding composition composed of fibrous filler, a potentially reactive phenol-formaldehyde resin and up to 5% by weight of water. No. 2,067,941. Clarence A. Nash, North Caldwell, N. J., to Bakelite Corp., N. Y. City.

A process of preparing a resin or balsam-like material which comprises heating a perhydro derivative of a diarylol methane compound with an organic monocarboxylic acid. No. 2,068,634. Herman Alexander Bruson and Lloyd W. Covert to Rohm & Haas Co., all of Philadelphia.

Rubber

Constructional sheets made of perforated sponge rubber; some of the perforations are filled with a filling material. No. 2,061,569. Albert C. Fischer, Chicago.

Freezing-resisting rubber composition consisting of a rubber compound containing an anti-freezing softening oil. No. 2,061,674. Joseph Rockoff to The Dayton Rubber Mfg. Co., both of Dayton, Ohio.

Rubber thread and method for making the same. No. 2,061,749. Carl L. Beal, Cuyahoga Falls, Ohio, to American Anode, Inc., Akron, Ohio.

Production of solid rubber-like masses by polymerizing vinyl isobutyl ether by means of boron fluoride. No. 2,061,934. Martin Mueller-Cunradi and Kurt Pieroh, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Method of preserving rubber by treating it with a reaction product of para amino diphenyl and acetone. No. 2,062,885. Joseph R. Ingram, Nitro, W. Va., to Monsanto Chemical Co., St. Louis.

Aqueous dispersions of hydrogenated rubber and process of preparing the same. No 2,063,073. Alfonso M. Alvarado to du Pont, both of Wilmington, Del.

Process for the stabilization of rubber latex. No. 2,063,982. Hugh Mills Bunbury, Prestwich, and Robert Bertram Fisher, Frank Clarke, Cheadle Hulme, Eng., to Imperial Chemical Industries, Ltd., Gt. Brit.

Method of making rubber articles with pebbled or crinkled surfaces. No. 2,064,143. Porter Lee Belton and Oscar Leroy Belton, Barberton, Ohio, to Seiberling Latex Products Co., Akron.

Method of plasticizing rubber. No. 2,064,580. Ira Williams, Woodstown, and Carroll Cummings Smith, Carneys Point, N. J., to du Pont, Wilmington, Del.

Preservation of rubber by treating with a product obtainable by heating 2, 2, 4-trimethyl-dihydro-quinoline with a strong non-oxidizing mineral acid. No. 2,064,752. Joseph R. Ingram, Nitro, W. Va., to Monsanto Chemical Co., St. Louis.

Method of producing a condensation product of rubber. No. 2,064,763. Thomas C. Morris, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.

Vulcanized rubber product produced by vulcanizing rubber in the presence of a diarylcarbamyl dialkylthiocarbamyl sulfide. No. 2,065,587. Louis H. Howland, Nutley, N. J., to U. S. Rubber Products, N. Y. City.

Rubber compound. No. 2,065,937. Glen S. Hiers, Cynwyd, Pa., to Collins & Aikman Corp., Philadelphia.

Destruction of color generating enzymes in ammonia preserved rubber latex. No. 2,066,559. John Edwardes to Heveatex Corp., both of Melrose, Mass.

Method of making a composite rubber article having different degrees of hardness. No. 2,066,798. Francis Norman Pickett, Westminster, London, Eng.

Method of manufacturing expended rubber. No. 2,067,020. Dudley Roberts to Rubatex Products, both of N. Y. City.

Method of reducing the viscosity solutions of unvulcanized rubber in an aliphatic hydrocarbon solvent. No. 2,067,299. Ira Williams, Woodstown, and Carroll Cummings Smith, Carneys Point, N. Y., to du Pont, Wilmington, Del.

Manufacture of artificial rubber by the polymerization of a compound of the group butadiene (1.3) and alkyl-substituted butadienes. No. 2,067,304. Eduard Tschunkur and Walter Bock, Cologne-Mulheim, Ger., to I. G., Frankfort, Ger.

Vulcanizable composition comprising unvulcanized rubber, sulfur and the reaction product of an alkaline polysulfide, a poly glycerol halogenated hydrin, and a di (halogenated alkyl) ether. No. 2,067,465. William P. ter Horst, Silver Lake, to Wingfoot Corp., Akron, Ohio.

The method of preserving rubber which comprises treating rubber with a symmetrical aralkyl disubstituted para-arylene diamine. No. 2,067,686. Waldo L. Semon, Silver Lake Village, Ohio, to The B. F. Goodrich Co., N. Y. City.

Manufacture of chlorinated rubber. No. 2,067,971. Frederick Peacock Leach, Frodsham, and Wilfrid Devonshire Spencer, Widnes, Eng., to Imperial Chemical Industries Ltd., Gt. Brit.

Preservation of rubber by the incorporation of deterioration inhibitors. No. 2,067,978. Arthur Morrill Neal to du Pont, both of Wilmington, Del.

Method of vulcanizing rubber which comprises heating rubber and sulfur in the presence of a rubber accelerator obtained by reacting a methylol carbamide and a dithiocarbamic acid. No. 2,068,355. Robert L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Textiles, Rayon

Process for softening and stretching filaments of organic cellulose derivatives. No. 2,061,565. Henry Dreyfus, London, Eng.

Process for stripping dyes from dyed textiles. No. 2,061,621. John Gwynant Evans and Henry Alfred Piggott, Blackley, Manchester, Eng., to Imperial Chemical Industries, Ltd., Gt. Brit.

Formation of cellulose coatings on cotton fibres by treatment with a cuprammonium solution followed by treatment with sodium hyposulfite solution. No. 2,061,686. Clarence B. White, Montclair, N. J., to Wm. E. Hooper & Sons Co., Baltimore, Md.

Method of dyeing and printing vegetable and artificial fibers by means of leuco sulfuric acid ester salts of vat dyestuffs. No. 2,061,860. Willy Tischbein, Leverkusen-Kuppersteg, Ger., to General Aniline Wks., N. Y. City.

Process for impregnating fabric with rubber dispersions containing non-tacky waxy substances. No. 2,062,178. Glen S. Hiers, Bala-Cynwyd, Pa., to Collins and Aikman Corp., Philadelphia, Pa.

Manufacture of threads, etc., from organic cellulose derivatives. No. 2,062,405. Henry Dreyfus, London, Eng.

Process for manufacture of threads from esters and ethers of cellulose and polymerized vinyl resins. No. 2,062,406. Henry Dreyfus, London, Eng.

Method of dyeing wool. No. 2,062,898. William R. Moorhouse, Boston, Mass., to National Aniline & Chemical Co., N. Y. City.

Spinning solution for manufacture of soft lustre products comprising a solution of viscose and cuprammonium cellulose and a petroleum fraction having a boiling point range of 125° to 150° C. No. 2,063,001. Hellmut Siebourg, Elizabeth, Tenn., to North American Rayon Corp., N. Y. City.

Process for treating cotton textile material with nascent hydrogen while the material is boiling under pressure in a closed chamber. No. 2,063,176. Rowland Magill, Atlanta, Ga., to The M. Werk Co., Cincinnati.

Process for making wool-like artificial fibers from a viscose material. No. 2,063,209. Arthur von Weinberg, Frankfort, Hanna Rein, Bad Hamburg vor der Hohe, and Otto Eisenhut, Heidelberg, Ger., to I. G., Frankfort, Ger.

Production of artificial filaments or threads of differential luster. No. 2,063,897. Reginald Henry John Riley, Reginald Henry Parkinson, and Herbert Henry Sims, Spondon, near Derby, Eng., to Celanese Corp. of America, Del.

Method of delustering fabric containing yarns of organic derivatives of cellulose comprising treating with barium sulfocyanide solution followed by a solution containing sulfate irons. No. 2,063,907. Camille Dreyfus, N. Y. City, and Herbert Platt, Cumberland, Md., to Celanese Corp. of America, Del.

Amino-carboxylic acid derivatives in the manufacture of textile materials. No. 2,063,908. Henry Dreyfus, London, Eng.

Production of assistants for the textile and related industries. No 2,063,934. Karl Keller, Frankfort-on-the-Main-Fechenheim, Heinrich Hopff, Ludwigshafen-on-the-Rhine, Eduard Gefferjé, Frankfort, and Joseph Nusslein, Ludwigshafen-on-the-Rhine, Ger., to I. G., Frankfort, Ger.

Processes of producing rayon. No. 2,064,118. Charles A. Huttinger, Lakewood, and Edward R. Timlowski, Cleveland, Ohio, to Acme Rayon Corp., Cleveland.

Process for degumming textile fibers. No. 2,064,130. Luigi Roffeni Tiraferri, Bologna, and Carlo Mazzetti, Rome, Italy.

Process for the production of artificial filaments, etc., so that there is an intermittent variation in the denier of the material. No. 2,064,279. William Ivan Taylor and John William Grebby, Spondon, near Derby, Eng., to Celanese Corp. of America, Del.

Method of bleaching a compact package of yarn produced from viscose with chlorine water. No. 2,064,300. John S. Fonda, Buffalo, and George W. Filson, Kenmore, N. Y., to du Pont, Wilmington, Del.

Mercerized cellulose fabric prepared by treating with a bath containing mercerizing lye and a monochlorxylenol. No. 2,064,883. Karl Brodersen, Dessau in Anhalt, to I. G., Frankfort, Ger.

Process of manufacturing artificial silk by squirting viscose of ripeness below 7 to 6° Hottenroth through the openings of a spinning nozzle into water. No. 2,065,175. Otto Eisenhut, Heidelberg, Hanns Rein, Hamberg von den Hohe, and Erich Kaupp, Ludwigshafen, to I. G., Frankfort, Ger.

Method of manufacturing a cotton fibre-like material from straw. No. 2,065,877. Soai Tanaka, Sakyo-Ku, Kyoto, Japan.

Method of treating yarns composed of an organic derivative of cellulose to render them more pliable during fabric-forming operations. No. 2,065,996. Camille Dreyfus, N. Y. City, and George R. Blake, Cumberland, Md., to Celanese Corp. of America, Del.

Method of coating organdy, muslin, etc., with a colorless vinyl resin to render the material slightly stiffened whereby it retains its original stiffness after washing. No. 2,066,079. Hyman Louis Shoub, Brooklyn, to The Starchless Curtain Perfector Institute, N. Y. City.

A method of making yarns of reduced lustre from organic derivatives of cellulose containing starch in suspension. No. 2,066,339. Camille Dreyfus, N. Y. City.

Preparation of yarns and filaments by extruding a mixture of an organic derivative of cellulose in a volatile solvent and a finely divided starch material into a drying atmosphere. No. 2,066,340. Camille Dreyfus, N. Y. City.

Method of simultaneously desulfurizing and scrooping filaments of viscose by treating with a neutral aqueous solution of an agent of fatty character. No. 2,066,371. Alfred Ernst Stein, Saflle, Sweden.

Manufacture of low lustre supple artificial cellulosic filaments by dispersing mineral oil and flakes of water insoluble alcohols in the filaments. No. 2,066,385. Henri Louis Barthelemy, Rome, Ga., to Tubize Chatillon Corp., N. Y. City.

Method of increasing the resistance to creasing of filaments, fabrics, etc., containing organic derivatives of cellulose. No. 2,066,492. Percy Frederick Combe Sowter, Spondon, Eng., to Celanese Corp. of America, Del.

Toxic agent and its application to vegetable fiber products. No. 2,067,046. George H. Ellis, St. Paul, to The Insulite Co., Minneapolis.

Production of artificial staple fibers. No. 2,067,174. William Alexander Dickie, Alexander McGill, and William Ivan Taylor, Spondon, Eng., to Celanese Corp. of America, Del.

Production of artificial staple fibers. No. 2,067,175. William Alexander Dickie and William Ivan Taylor, Spondon, Eng., to Celanese Corp. of America, Del.

Method of preventing curling of the weft due to electrification phenomena by applying to the yarns during weaving certain types organic compounds. No. 2,067,202. William Pool and Ernest Leslie Greenwood, Spondon, Eng., to Celanese Corp. of America, Del.

An article of manufacture for dry embossing of fabrics. No. 2,067,435. George C. Chatfield and Charles Emmey, N. Y. City.

Composition for the treatment of silk comprising a mixture of water-insoluble wax, a soap of a mineral oil sulfonic acid and a sulfonated fatty oil. No. 2,067,888. Dale S. Chamberlin, Bethlehem, Pa., to National Oil Products Co., Harrison, N. J.

Process for treating yarns containing organic derivatives of cellulose which comprises applying a water-insoluble lubricant and cresylic acid prior to fabric formation. No. 2,067,947. Herbert Platt, Cumberland, Md., to Celanese Corp. of America, Del.

Textile materials comprising filaments of cellulose acetate containing olive oil and a substance selected from the group consisting of the propenyl, allyl, vinyl, and cotonyl derivatives of guaethol. No. 2,067,950. George Schneider, Montclair, N. J., to Celanese Corp. of America, Del.

Yarn containing an organic derivative of cellulose and a lubricating compound comprising a complex ether. No. 2,068,003. George R. Blake and George W. Seymour, Cumberland, Md., to Celanese Corp. of America, Del.

Waterproofing textile fabrics by treatment with latex. No. 2,068,546. Joseph F. X. Harold, N. Y. City.

Water Treatment

Water treating apparatus. Nos. 2,061,714 and 2,061,715. Eric Pick to The Permutit Co., both of N. Y. City.

Apparatus for softening water. No. 2,061,797. Charles P. Eisenhauer, Dayton.

Method and apparatus for treatment of liquid sewage comprising settling, evaporating and finally burning the dried solids. No. 2,062,025. Joseph Harrington, Riverside, Ill.

Apparatus for use in purifying small batches of water for drinking purposes. No. 2,063,778. Orrin E. Andrus, Milwaukee.

Method of treating sewage. No. 2,065,123. John R. Downes, Middlesex, N. J., to Pacific Flush-Tank Co., N. Y. City.

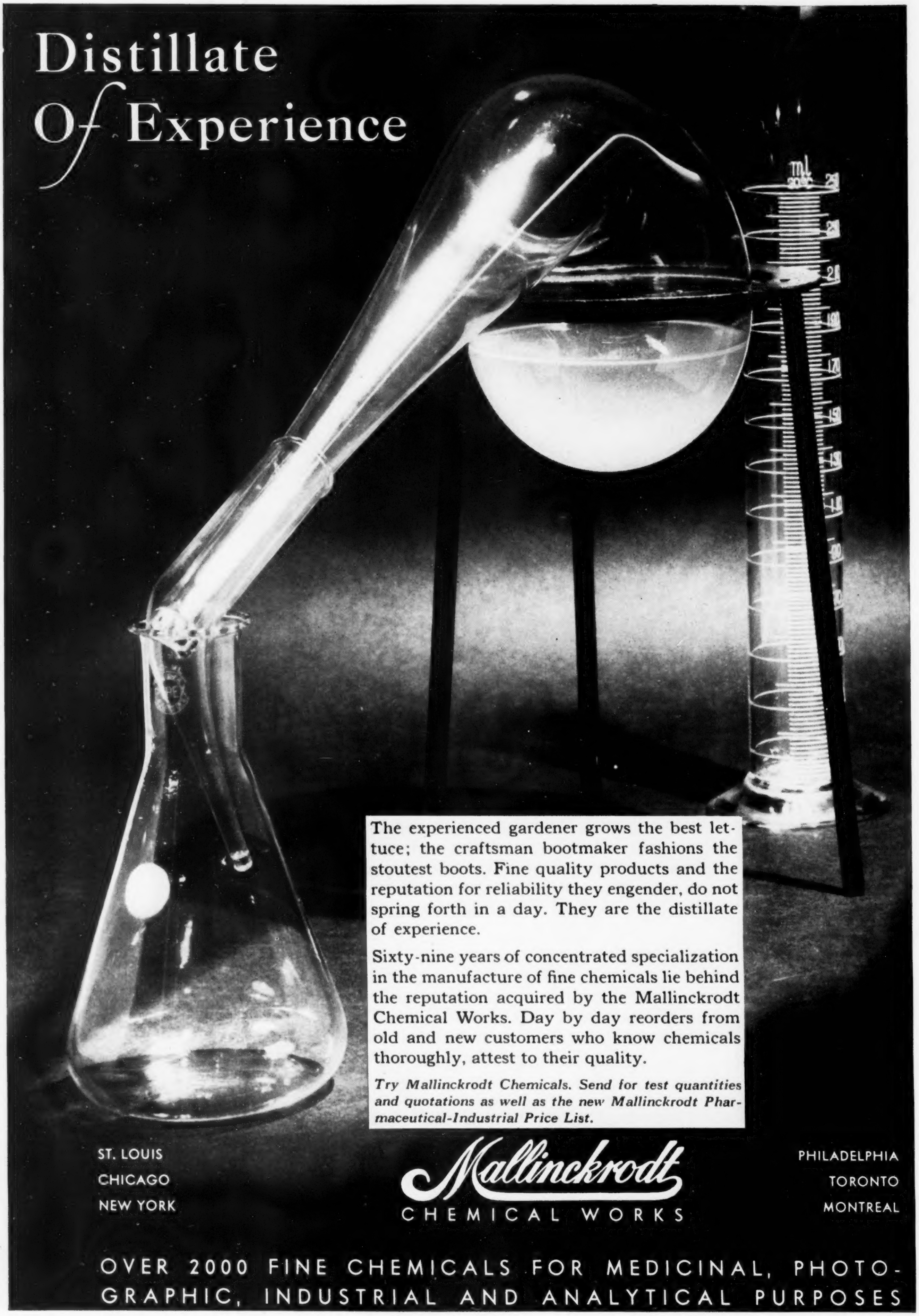
Sludge disposal plant. No. 2,066,418. Richard F. O'Mara to Raymond Bros. Impact Pulverizer Co., both of Chicago.

Water softening apparatus. No. 2,067,808. Arthur C. Zimmerman and Frank E. Knaack, to The Duro Co., all of Dayton, Ohio.

CHEMICAL SPECIALTIES

HOUSEHOLD
INDUSTRIAL
AGRICULTURAL

Foam-gun, a new Durez device made by the makers of the Dorman Star Washer. Produces a continuous worm of lather for rug or wall cleaning.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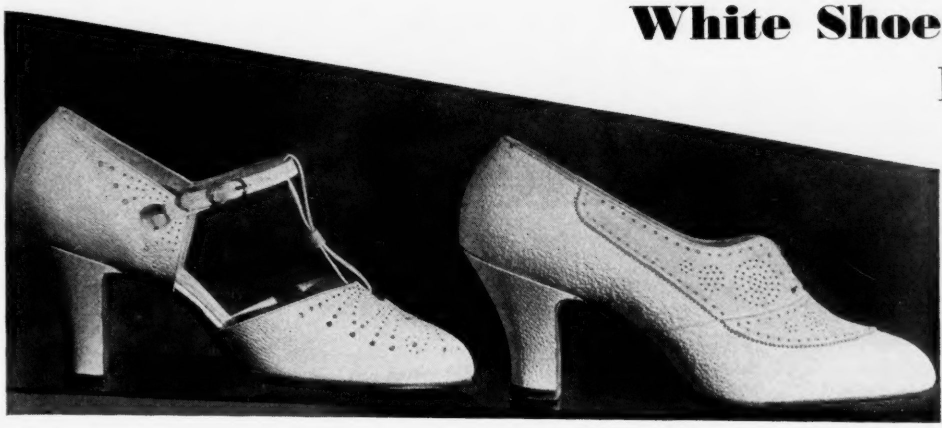
White Shoe Cleaner Formulation



By

Harold A. Levey

Consultant

CLEANERS for shoes are almost as old as shoes themselves. No part of our wearing apparel gets dirty so quickly, or needs cleaning so often as do our shoes. This is especially true of light colored shoes.

This so-called cleaning operation is really a two stage task. One is the removal or near removal of dirt or foreign matter, the other is the reconditioning of the surface to simulate that of the new shoe. This undertaking is usually achieved with greater or less success with a single composition of the present day types. However, the effectiveness of the present day cleaner is largely measured by its ability to form a successful coating of great hiding power. The actual cleaning operation or dirt removal may be accomplished by either brushing dry or wet, or wiping while wet with water or the particular shoe cleaner.

Types of Cleaners

One of the early varieties of cleaners was a bar of chalk which was rubbed on the shoe to renew its appearance. This had in its favor ease of application, relatively low initial cost, as well as cost per application. The cleaning job, however, was short lived, and the wearer experienced the additional difficulty of readily dusting off on the clothes. This product is still offered to the limited consuming public who still prefer this type. It is prepared by kneading a white chalk such as calcium carbonate with a minimum of water carrying in solution a small amount of glue or other adhesive. This paste is then placed in molds, pressure applied to form the mass to the shape of the mold. Heat is applied to drive off the water. On removal from the mold the bar of cake possesses the desired firmness, yet it is sufficiently loosely bound to permit the particles to be readily transferred from the stick to the shoe surface. A representative composition of this type and its cost is:

Calcium Carbonate	99%	
Animal Glue	0.995%	
Sodium Salicylate	0.005%	
Material Cost Per Pound		1.40c
Water to make 100 lbs.	3 gals.	

The sodium salicylate is dissolved in about ¼ of the water. The glue is allowed to soak in the water for several hours. The mass is then heated in a water jacket until all the glue passes into solution. The rest of the water is then added. The calcium carbonate is placed in a kneading machine. While the machine is operating the glue solution is sprayed in through a large number of small jets which disperse it throughout the mass.

Liquid types of cleaners came next, and these were paralleled by the paste form because of the concurrent popularity of the collapsible tube as a convenient container. Representative compositions of the early liquid types were made up as follows:

Lithopone	22%	
Dextrine	3%	
Borax	0.5%	
Water	74.5%	
Material Cost Per Gal.		15c

The early paste forms were of the same composition, except only about one-third of the amount of water was used; this was sufficient to make a paste of the viscosity desirable for collapsible tubes.

All types of cleaners are made up essentially of two elemental constituents: a pigment and a vehicle. This automatically characterizes them as a typical coating composition. Seldom, however, is either component a single substance, but rather a mixture of several of the same general type, each contributing a desirable property by its addition in properly formulated products.

The vehicle in turn is made up of a volatile and a non-volatile portion in the liquid. Certain of the paste type of cleaners, and also the solid forms of cleaners, which come in sticks, cakes or shallow cans, contain only a very small percentage of vehicle, all of which is non-volatile.

There are essentially two forms of vehicle mixtures: the water and the organic solvent types. Obviously, the non-volatile constituent of the vehicle must be more or less soluble in the volatile solvent to facilitate satisfactory application and formation of a continuous uniform coating film.

In lower priced liquid cleaners the water type of vehicle is invariably used. It usually carries a non-volatile vehicle consisting of some water soluble gum or resin. Very often the carbohydrate gums, such as the pentosans and pentose sugars, are employed. In these groups are included such gums as arabic, acacia, senegal, tragacanth, karaya, locust bean gum, and plant mucilages like Quince seed and Irish moss. Treated starches and the dextrines also act in a similar manner. Of course, water solutions of glue, gelatin, the alginates, alkali caseinates, agar, blood and egg albumen may also be used. In addition, there are now available several types of water soluble resins which serve excellently in this role. As water solutions of these products are unstable as well as excellent culture media for bacteria and mold growths, adequate amounts of preservatives must be included to act as inhibitors. Toxic inorganic salts and the phenolic types of preservatives are in general use.

Representative compositions in this class are made up in accordance with a general formula as below:

Mixed Pigments (Lithopone, Zinc Oxide, etc.)	25%
Vehicle (Dextrine, Arabic, Glue, etc.)	6%
Preservative (Sodium Salicylate, Thymol, etc.)	0.02%
Water	69%

The material cost of this type will vary from 15c to 25c per gallon depending upon the form of pigment and vehicle used.

With a demand for a waterproof form of cleaner, it became necessary to shift from water to the organic solvents. The petroleum hydrocarbons being the lowest in price and available with the proper boiling range, became the preferred solvent. However, if non-inflammability is a prerequisite, then more than three quarters of the petroleum hydrocarbon must be replaced with the carbon tetrachloride. The petroleum fraction which finds most extensive use is solvent naphtha with a boiling range of 200° to 300° F.

As the non-volatile vehicle for this type, the natural and synthetic resins are largely used. Many of these require the addition of more active solvents than the petroleum oils; for example, the aromatic hydrocarbons, and esters and ketones to bring them into solution. In fact the maximum amount of solvent naphtha is used as a diluent or thinner to a point just prior to precipitation of the resin from its solution in the active solvents.

In this same class, the lacquer type which is made up of a properly formulated solution of the cellulose esters such as the nitrate and acetate, might also be included. These cellulose derivatives are dissolved in their respective solvents and then diluted with non-solvents to their toleration point. To these products must be added suitable plasticizers in proper amounts to give the ultimate coating the desired flexibility. This type of composition is more frequently used as a permanent coating rather than for the uses referred to above. It is used for the trimming of the edges of the soles and the side faces of the heels, giving them a good wearing surface which dries to a hard permanent gloss in several minutes. A lacquer for this purpose is made up according to the following formulation:

Titanium Dioxide	25%
Cellulose Nitrate ½ sec. viscosity	8%
Ester Gum Pale	6%
Dibutyl Phthalate	6%
Ethyl Lactate	8%
Butyl Acetate	12%
Butanol	10%
Toluol	25%
	100%

This composition carries a material cost of $1.55 per gallon.

Among the natural resins used in the solvent type of cleaner are damar and extra pale rosin. Shellac, mastic, sandarac, etc. could be used, but would require alcohol as the solvent. The synthetic resins include pale ester gum, cumar, phenol-aldehyde, vinyl esters, glyceryl-phthalate and the like. These are worked into a solution in a manner similar to that described for the cellulose esters. Plasticizers are added to these gums and are of the same general type as for the cellulose derivatives, but include the various fatty glycerides. This variety would then be formulated as follows:

Mixed Pigments (Lithopone, Zinc Oxide, etc.)	22%
Vehicle (Pale Ester Gum, Damar, etc.)	4%
Plasticizer (Tricresyl Phosphate, Castor Oil, etc.)	1%
Solvent Mixture:	
Active Solvent (Ethyl Acetate)	18%
Diluent (Solvent Naphtha)	55%
	100%

This type of composition will vary for materials from 31c to 38c per gallon, depending upon the products selected for its make-up, the non-inflammable variety in the better grades costing 71c per gallon.

The agent primarily responsible for the final appearance of shoes so treated is the pigment. This is the only visible component, and upon its value rests most of the merit of the dressing. It gives to the surface its seeming cleanliness, freshness and new-like appearance. The vehicle, however, determines the longevity of these properties, barring accidents. The cheapest of these pigments is calcium carbonate as whiting, then certain clays, Asbestine, etc. The zinc pigments such as lithopone, zinc oxide and zinc sulfide are more costly on a pound basis, but as they require less to give equivalent hiding power and have better whiteness, they are of greater economic worth. This is equally true of the titanium pigments. Pure titanium dioxide is almost prohibitive because of its cost, but when used with calcium or barium sulfate as extenders it is almost as effective at a substantially reduced cost. These pigments are used in both the water and solvent types.

The emulsion type variety is a hybrid between the solvent and water types. It consists of an emulsion of the oil in a water type. A suitable emulsifying agent is added to a resin solution as above described, and at least half of the volatile solvent replaced by water. It is considered by some as a general utility composition. It can be formulated to be nearly non-inflammable and almost waterproof. It works nearly as effectively as a dressing for leather as for cloth. A typical composition under this classification is:

Titanium Dioxide	5%
Barium Sulfate	15%
Gum Damar	4%
Carbon Tetrachloride	10%
Solvent Naphtha	13%
Triethanolamine Linoleate	3%
Water	50%
	100%

The material cost of this composition approximates 37c per gallon. In preparing this product, the carbon tetrachloride is mixed with the solvent naphtha and the gum damar is dissolved in this mixture. This pigment combination is obtained already mixed and is incorporated with the above solution. The triethanolamine linoleate is dissolved in the water which should preferably be around 60° C. This is agitated vigorously with a suitable electric mixer while the pigment, gum and solvent mixture is being slowly added. Better results and a more permanent emulsion are obtained if this composition is passed through a colloid mill.

In compounding a suitable "Shoe White" certain ratios of the components are fairly closely adhered to in most of the satisfactory brands now on the market. The ratio of the dry pigment to the total weight of the finished product is between 15 per cent. and 30 per cent. depending on the type of pigment used. To this is usually added about 4 per cent. (all per cents. are based on the total weight of the finished product) of Asbestine to prevent packing of the pigment. If the product is of the water type, 5 per cent. to 7 per cent. of the proper type of gum is used. In addition a thickening gum such as tragacanth is added to give satisfactory body or viscosity to further prevent pigment settling and also to improve the flowing qualities of the preparation. A fraction of a per cent. of the preservative is added and a very small amount of a blue dye or pigment is added to correct the color. It has recently become popular to add a small amount of the proper type of perfume to increase the sales appeal. The above is of course subject to wide variations depending upon the type, use, and price requirements for the product in mind.

In fabricating these compositions it is quite essential that the pigment be thoroughly divided and wet with the vehicle. This operation may be performed in a ball or bar mill, or in the usual pigment rolls used by the paint manufacturers. In the compounding operation the vehicle is dissolved in the solvent, and the pigment added to this mixture. This product should be passed through a fine screen of 100 mesh, and then allowed to stand for several hours to allow the entrapped air to be released before packaging.

Most of these compositions described have to be swabbed on, and result in a fairly heavy layer for the finish. As each subsequent application of these solutions has the capacity of dissolving the residue of the preceding treatment, it is desirable to make a two operation job out of cleaning. This should consist of: First, the cleaning of the surface using the preparation as the cleansing agent through the solvent action of its vehicle and solvent. The rag, paper, cotton or dauber will carry most of the removed dirt (possibly back into the bottle containing the cleaner). Second, the flowing on or swabbing of the preparation as a coating composition to hide the spots and stains, leaving a uniform smooth matte surface simulating new shoes.

While many of these types of compositions are fairly meritorious products, they have many shortcomings and much remains to be done in the further development of products which are more effective, easily applied, and whose useful life is longer.

Note: All percentages in above formulas are computed on a weight basis.

Wetting Agents in the Paper Industry

The industrial applications of "soapless soaps" are increasing rapidly in many fields. Briefly, they are produced from natural fats or oils by reducing the fatty acids to the corresponding fatty alcohols. These alcohols are reacted with sulfuric acid, and the alcohol sulfate is neutralized with caustic soda to form the fat alcohol sulfate. The recent literature contains a wealth of material on the use of wetting agents in the textile field, but very little on their use in the paper industry.

WHILE wetting agents have yet to become firmly established as large volume raw materials in the paper industry, their consumption is steadily increasing as new applications are developed for them. Both in the manufacture of paper and in its subsequent conversion into special products, paper technologists are exceedingly active in investigating the possibilities of these materials. As costs of wetting agents are reduced, the fields of application are widened. This is particularly the case in pulp and paper where large volumes of low cost materials are handled usually at low concentration or consistency.

Removal of Ink from Old Papers

A notable example of the use of wetting agents which is meeting with considerable success is the Snyder Mac Laren Process for the removal of ink from old papers. In this process a wetting agent is used in conjunction with a mild alkali, such as silicate of soda or trisodium phosphate. The wetting agent causes the removal of the ink from the defiberized paper due to its selective wetting action. The papers are kneaded at high consistency in the presence of the alkali and wetting agent at a temperature around 160° F. The process is continuous. Heretofore deinking operations required many hours cooking in a digester under steam pressure in the presence of a relatively high percentage of caustic soda or soda ash. The application of wetting agents to this operation has resulted in a low temperature, continuous process. Furthermore, the resulting pulp is more free and losses are reduced because of formation of less alkali cellulose. The low temperature process is also applicable to groundwood papers which are discolored by caustic soda at the temperatures employed in the intermittent process.

Another field in which wetting agents have become established is in the impregnation of saturating papers. For example, in the manufacture of rubber latex saturated papers, it has been found possible to employ a stronger and more dense paper for saturating when wetting agents are used in the impregnating vat.

An interesting application for wetting agents is in the defiberizing of lap pulp. Ofttimes because of limited beating capacity mills like to put the beater roll down on their stock as soon as it is furnished to the beater. This cannot be done until the pulp is broken up thoroughly. Wetting agents are employed to speed up this initial defiberizing action so that the beating time is decreased and larger capacity is made available in the beater room. In this application the wetting agent ofttimes pays for itself in power saving.

In the Manufacture of Absorbent Papers

Considerable work has been done on the use of wetting agents in the absorbent papers field, such as hand towelling and sanitary napkins. To date their use is restricted by cost, but they are employed in special instances on modified products. Here the question of wet strength of the paper product is not essentially important. By causing more rapid penetration of water, wetting agents lessen the strength interval, or time the sheet will hold together.

Wetting agents are well established in the cleaning of felts and are quite generally employed for this purpose. One of the most difficult problems in felt cleaning is found in mills making carbonate filled papers. The calcium carbonate becomes imbedded in the interstices of the felt and clogs the fabric so that it will no longer remove water from the wet paper. To date hydrochloric acid is generally used to remove the carbonate but its application is not desirable for obvious reasons. Many wetting agents have been tried for this purpose. There is a good field awaiting the material that will do this job well.

In the formation of paper on a wire screen, either cylinder or fourdrinier, difficulty is sometimes experienced in getting the water to drain from the stock. Wetting agents have been found greatly to increase the rate of removal of water from the fibre. Little has been done in this field as yet; but two promising methods of employing wetting agents for this purpose are in course of development. One method consists in coating the wire screen with a film of wetting agent immediately before it contacts the stock. The other approach is to impregnate the suction box covers with a wetting agent. This second means has an additional advantage inasmuch as it reduces friction at the suction boxes, resulting in longer fourdrinier wire life. At the same time, the wetting agent helps to keep the wire clean.

Other interesting applications for wetting agents are their use in special coating work wherein coating materials are not sufficiently wetted by water alone, so that to secure uniformity, wetting agents are employed. Wetting agents have also been found applicable to the problem of removing resins from pitchy woods. In this case their action is similar in principle to that in deinking of waste papers.

Preparation of Bordeaux Mixtures

Bordeaux mixtures made with equal weights of quicklime or of commercial hydrated lime are not equivalent, and substitution of the latter in a bordeaux formula affects both the transparency and the adhesive quality of the mixture (the former only slightly, but the latter noticeably and adversely when mixtures of the type of 4-2-50 are used). The dispersion of the copper precipitate in bordeaux mixture is readily measured by the rate of settling. In mixtures using strong lime to weak copper or the reverse, good results follow in both cases if quicklime is used, but when commercial hydrated limes are employed the sedimentation rate is markedly affected by the strength of the mixture in $CuSO_4$ the ratio of $CuSO_4$ to lime, and the method of mixing, but practically not at all by the fineness of the hydrate used when the method of mixing forms washes settling at the same rate as the preparation from quicklime. "The data also show that whenever strong lime to weak copper produces rapidly settling mixtures then the fineness of the hydrated lime substantially affects the rate of settlement and a distinct benefit ensues from the use of very finely ground commercial hydrate. And conversely when bordeaux mixtures are prepared from commercial hydrated limes, the degree of fineness of the lime used is without importance when strong copper to weak lime is the method of mixing employed." O. Butler, *New Hampshire Sta. Circ.* 49, '36, p8.

Pine Oil for Disinfectant Manufacture

By B. H. Little

Naval Stores Department, Hercules Powder Company

THE manufacture of pine oil by the steam-solvent method from the sap wood of the long-leaf yellow pine tree has created a major industry. Pine oil made by this process is commonly called steam-distilled pine oil and should not be confused with pine needle oil or destructively distilled pine oil.

The more common uses of steam-distilled pine oil are in the textile, mining, disinfectant, miscellaneous detergents, and paint and varnish industries. Very little destructively distilled pine oil or pine needle oil is used for the manufacture of bulk disinfectants.

Steam Distilled Pine Oils Vary in Composition

Not all steam-distilled pine oils are alike. Therefore, the disinfectant manufacturer is interested in the use of steam-distilled pine oil that will give a quality pine oil disinfectant. A quality disinfectant is defined primarily from the viewpoint of obtaining as high a phenol coefficient as possible, and minimum moisture content. In addition, ease of emulsification or dilution also is important. It follows, therefore, that a steam-distilled pine oil from the disinfectant manufacturer's viewpoint can be classed broadly as low-quality or high-quality. Experience has shown that a steam-distilled pine oil containing the greatest quantity of secondary and tertiary terpene alcohols more nearly meets the quality demand of the disinfectant manufacturer. Based on existing information, the phenol coefficient value and ease of emulsification of pine oil are based largely on the secondary and tertiary alcohol content; hence, a high-quality pine oil is one that contains these constituents in the largest amount. For example, the following typical analyses of two steam-distilled pine oils, even though they are quite similar in appearance, nevertheless, represent a high-quality pine oil for disinfectant manufacturing use and a low-quality pine oil.

	High-Quality	Low-Quality
Specific Gravity	0.9458	0.9115
Refractive Index	1.4827	1.4797
Unpolymerized Residue	1.2%	0.4%
Moisture	0.1%	0.1%
Color—Lovibond	1 Amber 0.25 Red	5.0 Amber
Combined Secondary and Tertiary Alcohols	90%	51.5%
Distillation Range 5%	216.6	181.3
30%	217.5	192.5
50%	218.1	201.3
70%	219.0	210.5
95%	223.5	224.1

The combined alcohols represent the total content of tertiary and secondary alcohols. It is evident from the foregoing comparative analyses that the low-quality pine oil actually will have the lightest color. It also is evident that the low-quality pine oil, as indicated by the combined total alcohol content and the much wider distillation range, especially in the initial part of the distillation range, contains a much higher content of terpene hydrocarbons which have practically no phenol coefficient value. G. F. Hogg and the author have made a comprehensive report on the subject of steam-distilled pine oil as a disinfectant with relation to its germicidal efficiency. It is suggested that those who are interested in this information may refer to the publication of the data in *Soap*, June, 1935.

Pine oils are, for practical purposes, insoluble in water. They are readily made miscible in water by blending with a suitable emulsifier. Suitable emulsifiers are rosin soap, vegetable oil soap, sulfonated castor oil, and compounds of these general types having soap-like properties.

A. F. Stevenson—reprint No. 304, Public Health Report, Vol. 30, No. 41, 1915; Hygienic Laboratory Bulletin No. 82, U. S. Department of Agriculture, Washington, D. C.—summarizes the use of pine oil in the miscible form as a disinfectant. Stevenson's work later was checked and modified by L. P. Shippen and E. L. Griffin, U. S. Department of Agriculture, Dept. Bulletin No. 989, June 23, 1923, Washington, D. C. These workers discussed the production and uses of pine oil as disinfectants. The formula they use often is referred to as the Hygienic Laboratory Formula, expressed as follows:

Oil	1,000 grams
Rosin	400 grams
25% Sodium hydroxide solution	200 grams

Miscible pine oil disinfectants are prepared today by formulas other than the Hygienic Laboratory Formula. Typical of such formulation is the following:

High-quality pine oils	80 parts
Double sulfonated castor oil	20 parts

Tests of one of the formulas, in which a high-quality pine oil was used, showed the disinfectant to have a phenol coefficient of 5.2. After aging six months, the same sample showed a phenol coefficient value of 5.0, decreasing in value only 0.2 units during the six months' period. When properly formulated, pine oil disinfectants made from a high-quality pine oil show very little deterioration upon aging for a reasonable period of time.

Proper Basis for Purchase of Pine Oil

The disinfectant manufacturer should purchase a pine oil having a uniformly high combined secondary and tertiary alcohol content as a raw material for the manufacture of pine oil disinfectants best adaptable for dependent disinfection of inanimate objects.

Summary of Types

Summarizing them briefly:—1. Pine oils are not alike. The three general types are: a. Steam-distilled pine oils, b. Pine needle oils, c. Destructively distilled pine oils. Of these three types of pine oils, very little of pine needle oils and destructively distilled pine oils are used in the manufacture of bulk disinfectants.

2. Not all steam-distilled pine oils are alike. The phenol coefficient value of steam-distilled pine oil depends on its having the maximum content of secondary and tertiary alcohols. The disinfectant manufacturer should purchase high-quality pine oil by specification.

Dr. Charles F. Mason Discusses

Sealing Waxes

SEALING waxes comprise one subdivision of a large group of compositions designed for sealing purposes, and since sealing compositions cover a wide variety of materials, properties and industries, only sealing waxes can be described in this article. This industry was originally developed in Europe, principally Germany, and has been transplanted in the United States where the only changes have been the introduction of less expensive materials.

They are used upon paper and bottle caps; the largest consumers being banks, express companies and miscellaneous organizations which are required to seal valuable documents and packages for storage or shipment. The use upon bottles has been displaced by the modern plastics, and upon paper their properties have been improved to meet the demands of recently developed wrappings like Glassine and Cellophane.

The term sealing wax is a misnomer in that few contain any wax at all and in the writer's opinion wax acts only as a filler for which less expensive materials could be substituted. They comprise principally plasticized resins with inorganic fillers and pigments. The primary requisites are smoothness of texture, brilliancy of gloss, absence of obnoxious odors upon melting, wide range of softening points, rehardening without the appearance of a rubbery behavior, retention of color and fracturing without crumbling.

They are classified below according to form available for use and types of paper to which they are to be applied.

Type A. Sticks, to be heated over a direct flame.

Type B. Bulk, to be heated in pots, electric or gas.

Type A

Types of paper to which they must adhere.

1. Parchment, rag white, bond, 100% rag, ledger, Glassine.
2. Hard and rough surfaced paper, Kraft, Manila, sulfite.
3. Medium finished paper, Kraft, Manila.
4. Soft finished paper, wrapping, Manila.
5. For bottles and insulators.

Careful purchasers, like government procurement departments, require all the above mentioned qualities and in addition those listed below.

1. After application to paper it should remain soft for a sufficient length of time for a brass die to be pressed into it and upon removal the design must be clearly marked.
2. It must separate from paper without pulling fibers with it.
3. Maximum flexibility, no stringiness upon heating, drops must fall about two seconds apart from heated portion.
4. Type B. Only 1.30% of sediment is allowed when melted in a glass container over electric or gas heat.

Seventeen formulas of compositions designed to meet the above exacting conditions are listed below. Their use requires indirect heating containers, mixing equipment, molds, and buffing machines for polishing the sticks. They are divided into two groups; those containing some wax and those containing none.

It is obvious that the seven formulas in which no wax is compounded are arranged in the order of decreasing cost of raw materials and the first five would correspond very closely to the five subheadings of Type A. A decreasing amount of shellac with its substitution by rosin, while other components are kept nearly the same, results in less adhesion, more brittleness and other divergences from the requirements listed above.

The balsams are present only for imparting pleasant odors and can be chosen to suit the taste; the quantity being so small that little softening action is introduced by the essential oils present. Venice turpentine is listed in all seven formulas and although expensive is a good plasticizer. It should only be purchased from reliable people because recently mixtures of fused rosin and castor oil have been introduced and sold as genuine.

Wax-Containing Formulas

1.	Shellac	33
	Wax I. G. O. P.	5
	Venice Turpentine	20
	Talc	10
	Pigment	25
	Tricresylphosphate	5
	Balsam	2
2.	Carnauba Wax	40
	Paraffin	20
	Magnesia	15
	Bronze	25
3.	Carnauba Wax	30
	Bees Wax	20
	Paraffin	20
	Whiting	4
	Barium Carbonate	10
	Pigment	16
4.	Rosin	30
	Venice Turpentine	22
	Paraffin	6
	Whiting	12
	Barium Carbonate	12
	Pigment	18
5.	Montan Wax	40
	Japan Wax	10
	Paraffin	15
	Whiting	9
	Barium Carbonate	10
	Pigment	16
6.	Paraffin	70
	Bees Wax	10
	Japan Wax	17
	Aniline Dye	3
7.	Montan Wax	40
	Japan Wax	10
	Paraffin	15
	Whiting	9
	Barium Carbonate	10
	Pigment	16
8.	Rosin	34
	Venice Turpentine	24
	Paraffin	6
	Whiting	10
	Barium Carbonate	10
	Pigment	16
9.	Montan Wax	8
	Japan Wax	20
	Paraffin	52
	Pigment	20
10.	Rosin	30
	Venice Turpentine	22
	Paraffin	6
	Whiting	12
	Barium Carbonate	12
	Pigment	18

Non-Wax-Containing Formulas

1.	Shellac	53.00
	Venice Turpentine	30.00
	Vermilion	16.85
	Magnesite	0.05
	Balsam (Fir)	0.10
2.	Shellac	38
	Venice Turpentine	22
	Magnesia	10
	Pigment	26
	Turpentine	2
	Balsam (Fir)	2
3.	Shellac	25
	Rosin	10
	Venice Turpentine	22
	Talc	14
	Pigment	25
	Turpentine	2
	Balsam	2
4.	Shellac	3
	Rosin	25
	Venice Turpentine	22
	Whiting	13
	Barium Carbonate	12
	Pigment	22
	Turpentine	3
5.	Shellac	5
	Rosin	25
	Venice Turpentine	21
	Whiting	13
	Barium Carbonate	11
	Pigment	22
	Turpentine	3
6.	Shellac	20
	Rosin	12
	Venice Turpentine	22
	Talc	17
	Pigment	25
	Tricresylphosphate	4
7.	Shellac	8
	Rosin	25
	Venice Turpentine	20
	Whiting	11
	Barium Carbonate	11
	Pigment	22
	Turpentine	3

Pigments and Mixtures

White, Zinc Oxide, Barium Sulfate, Lithopone.
Yellow, Ochers, Chrome or Zinc Yellow.
Bright Yellow, 60 Lithopone, 40 Chrome Yellow.
Orange, Chrome Orange, or 80 Ocher—20 Angelic Red.

Pigments and Mixtures—Continued

Red, Mercuric Sulfide, Red Lead, Ochers.
Light Red, 60 Zinc Oxide, 40 Chrome Cinnabar (Mercuric Sulfide).
Rose, 85 Zinc Oxide, 15 Chrome Cinnabar (Mercuric Sulfide).
Brown, 85 Angelic Red, 15 Carbon Black.
Light Brown, 20 Lithopone, 20 Ochers, 45 Angelic Red, 15 Carbon Black.
Blue, Ultramarine, Paris Blue.
Light Blue, 60 Lithopone, 40 Ultramarine.
Green, Chrome Green or Zinc Green.
Yellowish Green, 60 Lithopone, 20 Chrome Yellow, 20 Chrome Green.
Light Green, 65 Lithopone, 35 Chrome Green or Zinc Green.
Black, Carbon Black.
Gray, 95 Lithopone, 5 Carbon Black.
Bronze, Bronze Powder.
Gold, Brass Powder.
Silver, Aluminum Powder.
Copper, Copper Filings.

Venice turpentine was adopted in this industry before the modern plasticizers and synthetic resins were developed and its substitution by less expensive ones can be done but only by experiments. Fillers like magnesite, whiting, magnesia, talc, and barium carbonate serve a two-fold purpose; they lessen the cost, and tone down the color of the pigment. In formula No. 6 tricresylphosphate is introduced. This is a plasticizer and is one example of many others which could be adopted.

In the ten formulas where waxes are embodied Nos. 2, 3, 5, 6, 7 and 9 have waxes only. They are more expensive than those containing only rosins and are softer as well as more brittle. Their use is restricted to bottle seals. During application they must be heated by steam and in the molten condition must be stirred constantly to prevent pigments and fillers from settling to the bottom. This is not the case when rosins are involved because the viscosity is such that the inerts remain suspended.

The danger of heating directly and vigorously during manufacture and application cannot be overemphasized because the natural material shellac loses its hardness and flexibility and the possibility of decomposing the fillers and their subsequent interaction with the rosins would result in bubbles and far from uniform qualities of product. In closing, this industry could be given a new lease of life by introduction of transparent sticks of sealing wax colored like the modern plastics so common upon umbrella handles, pipe stems, and other sundries.

Synthetic resins which are capable of being plasticized to transparent bodies are available for seven cents per pound and although the pigment would have to be eliminated and an aniline dye substituted, the cost would compare with those sold to-day and a static industry might take on more life.

Soaps from Unusual Materials

The announcement that certain German firms are investigating the question of producing fatty acids and soap-making materials from coal and petroleum products means that if fats can be made along these lines suitable for soap making, this releases vegetable and animal fats for purposes of glycerine manufacture. Thus there may be a link between coal by-products and nitroglycerine, which is a product of importance for explosive manufacture. It is reported, for instance, that a new factory is to be started in the Ruhr district for the conversion of coal products into fatty acids, to be operated by the Deutsche Fettsaure Werke G.m.b.H.

Brit. Pat. 433,305 (I. G. Farbenindustrie) is typical of several which relate to the manufacture of carboxylic acids, and ultimately soaps, from unusual materials. In this process oxidation products of non-aromatic hydrocarbons of high molecular weight are dissolved in a solvent, non-soluble in water. The solution is then treated with an alkaline substance in aqueous solution so that the acid portions of the hydrocarbon material are neutralized, the aqueous soap solution obtained then being separated and the unsaponifiable matter removed by extraction with another insoluble solvent. The soap solution is evaporated down and formed into shaped soaps, powders or other suitable form.

Carboxylic acids for extraction along these lines may be made by the oxidation of a variety of hydrocarbon raw materials, paraffin wax and products obtained by the destructive hydrogenation of coal and of tar. Oxidation is brought about by air in conjunction with catalysts, as, for example, sodium and manganese palmitates, which are employed for the oxidation of paraffin wax. Again, the same inventors, in a later patent, produce material having wetting, washing and dispersing properties by oxidizing products obtained from lignite or hard paraffin wax. Here the hydrocarbons are treated in the liquid phase.

Henkel and Cie describe the manufacture of sulfonated products having wetting and emulsifying properties in Brit. Pat. 424,891. Tertiary carbinols derived from carnauba wax, linseed oil, rape oil, sperm oil, wood oil, wood fat, naphthenic and resin acids are sulfonated in the presence of a dehydrating agent.

Waxes as a source of material from which to manufacture cleansing and emulsifying agents are dealt with in Brit. Pat. 428,156 (Chemical Works, formerly Sandoz, of Basle). In one process a mixture of anhydrous glycerine and spermaceti or spermaceti oil is treated with oleum, or spermaceti oil may be treated with a mixture of glycerine sulfuric acid esters. The products obtained are claimed to be of use in the textile and leather trades. Some earlier methods of preparing wetting agents from waxes and similar bodies may be found by referring to Brit. Pats. 354,217 and 343,524.

Resins and resinates are frequently used in soap manufacture, but a du Pont (U. S.) process is of somewhat different order. It concerns the manufacture of wetting agents from gum rosin which may be employed in washing, cleansing, dyeing and bleaching textile materials and in the processing of furs and hides. In Br. Pat. 425,217, gum rosin dissolved in alcohol is treated with caustic soda and then condensed with sodium chloropropanol-sulfonate, or a halogen substituted ethane sulfonate.

Products obtained from herring oil or other unsaturated bodies which have wetting, washing, dispersing and emulsifying properties and which may be dried and incorporated with other soap-like materials, or dyes, and may be perfumed, are made by processes protected by Deutsche Hydrierwerke A.-G in Brit. Pat. 434,452. Unsaturated fatty alcohols having an iodine value of at least 100 are sulfonated between $-5°$ and $+30°$ C. The resulting material would probably have properties akin to the sulfated fatty alcohols and other soapless detergents such as are coming to the front today for toilet as well as industrial use.

Chemicals allied to "mustard gas" can be made under the suggestion of a use as wetting and cleansing agents. In Brit. Pat. 434,358, Waldmann and Chwala, of Vienna, propose to manufacture wetting and washing agents from $\beta\beta$.dichlordiethyl ether. This compound is treated with alcoholic sodium sulfite, and then the product is treated with methylamine and acylated with lauric acid chloride. *The Chemical Age*, January 9, 1937, p. 28.

Arsenic as a Raticide

Antiplague control work with the rat in South America during the last 6 years is said to have demonstrated arsenic to be the most satisfactory treatment, it being cheap and always well taken by the rats if care be taken to make the vehicle attractive. It is sufficiently slow in action to allow the rodent to leave and prevent the release of infected fleas within the inhabited premises. P. D. Long, *Public Health Reports, U. S.*, 51, '36, No. 18, p551.

A FEW DROPS MAKE
A WHALE OF A DIFFERENCE!

WHEN A P. Q. SILICATE OF SODA IS THE DEFLOCCULANT

TRY mixing clay with a small quantity of water to make a stiff mass. Then add a few drops of P.Q. Silicate (less than 0.1%). It pours, and now can be pumped through one inch pipe. This illustrates deflocculating action of P.Q. Silicate of Soda.

Thus the potter uses greater amounts of clay with a minimum of water and casts heavy earthen pieces such as sanitary ware without shrinkage and cracking.

In purifying clays, P.Q. Silicate is used to allow rapid settling of contaminating materials.

A P.Q. Silicate in ore flotation deflocculates the gangue particles while valuable minerals are carried in the froth to be recovered. This same dispersing effect of P.Q. Silicates serves you in numerous cleaning operations which require the disposal of insoluble dirt—such as metal cleaning, laundering, bottle washing, etc.

Let us help you with a problem.

USES OF P. Q. SILICATES AS DEFLOCCULANT

Deflocculating Clays	Ore Flotation
Water Treatment	Crank Case Oil Refining

PHILADELPHIA QUARTZ CO., PHILADELPHIA

General Offices and Laboratory: 125 S. Third St., Phila., Pa. Chicago Sales Office: Engineering Bldg. Stocks in 60 cities. Sold in Canada by National Silicates Ltd., Toronto, Ont.

Works: Anderson, Ind., Baltimore, Md., Chester, Pa., Buffalo, N.Y., Kansas City, Kans., Rahway, N.J., St. Louis, Mo., Utica, Ill.

ESTABLISHED 1831

Please send me Bulletin 171, Silicates of Soda.

Name ______________ *Title* ______________

Organization ______________

Address ______________

City ______________ *State* ______________

Industrial Specialties

Expanding Manufacturing Facilities

For the 10th successive year, The Baltimore Paint & Color Works will add to its plant and facilities. It has purchased two pieces of property, which adjoin the rear of the plant. Plans call for the addition of a second story over this site and for a two story building adjoining, which will cover the rear of its present property. The Baltimore Paint & Color Works which is now entering its 18th year, manufactures paints, varnishes, waxes, and auto specialties.

Deecy Products, manufacturer of leather and textile chemical specialties, is in new quarters at 120 Potter st., Cambridge.

Textile Chemical Products, Greensboro, N. C., has removed to much larger quarters on High Point Road. An expanded laboratory under the direction of S. V. Valjavec will be opened.

Berlou Manufacturing, producer of moth-proofing chemicals, formerly located in Minneapolis, is now in an enlarged plant in Marion, Ohio.

News of the Industrial Specialty Companies

Detroit Rex Products, manufacturer of industrial detergents and solvents, is doubling the sales quotas of salesmen for '37.

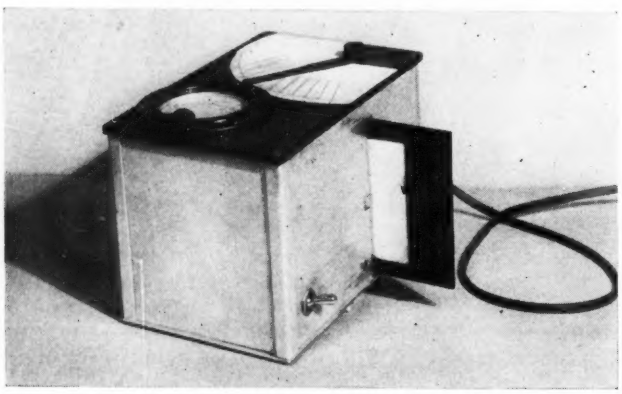
E. N. Sargent Pulp & Chemical Co., N. Y. City distributor, has leased space at Port Newark and will make liquid bleach.

American Disinfecting held its annual sales meeting last month at the headquarters at Sedalia, Mo.

Merchants Chemical, N. Y. City, is actively pushing the sale of the malium method of fur storage under the direction of Bert Cremers. Malium gas was developed originally by Michigan Alkali for the fumigation of food products.

Reflectometer Perfected

Research engineers of Richard Chemical Works, Jersey City, have perfected a reflectometer which is valuable for the control



Checking cleaning efficiencies need no longer be guess-work

of the manufacture of soaps, in the development of new ones, and to check cleaning efficiencies.

Heard and Overheard In the Specialty Field

Davies-Young Soap, Dayton, is offering free samples of its Pennant Soap to dry cleaners; Penn Salt, Philadelphia, has changed the name of its Vitex, well-known in the dyeing and cleaning fields, to Pensal; Gadi, Inc., Memphis leather dye and polish manufacturer, has moved to larger quarters and has doubled production capacity.

Personnel and Personal

The first of the year brought several changes and additions to the staffs of important industrial chemical specialty producers. Davies-Young Soap, Dayton, has Amos Earl Harris as Texas representative with Dallas headquarters; Midland Color & Chemical, N. Y. City, has opened a Philadelphia office and has appointed two new representatives, Irving Oldak in Boston and Ralph Sacks in Connecticut. Magnus Chemical, Garwood, N. J. has appointed Leon Smith as Maine representative; Arthur Eckhart, formerly with Magnus Chemical in Iowa and Illinois, is now Texas representative for Magnus Products.

Dr. Donald Price, noted chemist and formerly of the faculty of Columbia, has joined the research staff of National Oil Products, Harrison, N. J. His Ph.D. degree was received from Columbia in '30.

DR. DONALD PRICE — GEORGE ZUST

Two in personnel changes at National Oil Products

The Paper Chemicals Division of National Oil Products has been recently reorganized and enlarged. Division will be in charge of George Zust who has been connected with the sales activities of the company since 1927.

Perhaps the most interesting part of the recent changes is the newly erected experimental laboratory. The research as well as the new practical testing laboratory is in charge of James Fritz, well known paper chemist.

J. C. Miller Co., Grand Rapids, has appointed new representatives as follows: R. Wallace Smith, 1836 Euclid ave., Cleveland; R. L. Redmond, Stormfeltz-Lovely Bldg., Detroit; R. H. Alden, 1812 Pilgrim Rd., Toledo.

E. E. Yake, who resigned Jan. 1 as executive vice-president of the Sulphonated Oil Manufacturers' Association, has accepted a position as assistant to the president of Royce Chemical, Carlton Hill, N. J.

William H. Boyce, formerly with Pittsburgh and West Virginia Gas, has been made general manager of the Pokadot Chemical Co., Greenville, Pa. Company manufactures household and industrial chemical specialties.

Harry Cole, Baird & McGuire secretary, and for several years the secretary of N.A.I.D.M., is on a year's leave of absence because of ill-health. In recognition of his outstanding services to the association he was elected at the December meeting to an honorary membership.

John N. Curlett has been elected a vice-president of McCormick & Co., Baltimore.

Philip A. Houghton, Inc., Boston, is now the New England agent for Murray & Nickell Manufacturing, producer of raw materials for the makers of insecticides.

National Oil Products' Southern Plant

National Oil Products, Harrison, N. J., has acquired a plant and 52 acres of ground at Cedartown, Ga., near Atlanta, and will start production very shortly. In a statement to the *Atlanta Constitution*, J. H. Barton, vice-president, explained the reasons for the establishment of another producing point:

"We found, during the last two years, that our business has been moving away from us in tremendous strides. Our best customers are operating in the south today and so we have had to come south to be near them."

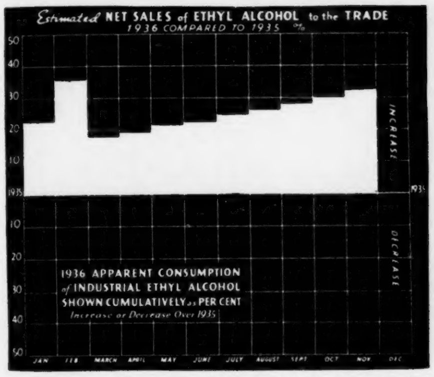
A PRODUCT OF U.S.I.

SOLVENT NEWS

Reg. U. S. Pat. Off.

A PRODUCT OF U.S.I.

February ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1937



Apparent consumption of industrial ethyl alcohol from Jan. 1 to Nov. 30, 1936, was 68,870,000 wine gallons. This is 33.0 per cent greater than during the same period in 1935 when 51,757,000 wine gallons were consumed.

Executives in the drug, chemical and cosmetic industries will meet in New York City on Thursday, March 4th, for the Twelfth Annual Drug, Chemical and Allied Trades Banquet.

COMBAT MOLD GROWTH ON PAINT FILMS WITH ORGANIC FUNGICIDES

Paint manufacturers are studying with interest the results of recent research on mold growth on paint films. Mildewing or fungus growth is usually observed where high temperature and humidity occur together.

Tests said to establish the efficiency of certain fungicides yielded two satisfactory agents not too poisonous for general use—thymol at 0.8 per cent concentration and parachlormetacresol at a concentration of 0.3 per cent. The latter seems to be preferred since the volatile thymol is not a permanent remedy.

When mildewed surfaces are repainted it is suggested that they first be sterilized with a solution of parachlormetacresol and then painted with a mildew resistant paint.

NEW, FAST-DRYING PRINTING INK AVAILABLE; NO HEAT REQUIRED

Cleaner, sharper printing and faster drying without heat are among the advantages listed by the manufacturer of a new type of ink. When applied to a plate, it acts as a plastic film because of its unique consistency. Formulation with a new vehicle eliminates the use of large amounts of oil and grease common to ordinary inks.

It is available as a dull black which is not only "non-scratch" but allows imprinted sheets to be put through a folding machine 90 to 120 minutes after leaving the press. Magazine, package and tin printing are described as some of its applications.

W. J. FRIED SUCCEEDS HARRISON

Walter J. Fried, well known in industrial alcohol circles, has been appointed to succeed Paul Harrison as Manager of Alcohol Sales of the New York Division.

Formerly Assistant Manager of U. S. I.'s Eastern Alcohol Sales, Mr. Fried assumed his new duties on Jan. 1 when Mr. Harrison retired.

SOLVENT CONSUMING MARKETS SEE BIG GAINS AHEAD FOR 1937

Indications Point to Continuance of Upward Trend Which Characterized Last Year

Barring labor troubles and other disturbing factors which might curtail the operations of important consumers, solvent consuming markets in 1937 should witness an extension of the gains recorded in the year ended. Practically every consuming outlet drew more heavily upon solvents in 1936, and one of the more encouraging features to trading was that—with some allowance for seasonal influences—the trend was steadily upward with the largest volume of sales in the last quarter of the year.

Eleven months' statistics show that the apparent consumption of industrial ethyl alcohol was 33 per cent greater than in the parallel period of 1935. Another index may be found in the production of synthetic methanol which reached an all time high in 1936.

Coating Industries

Reviewing the larger solvent consuming markets, one finds the paint, varnish and lacquer industry with sales totaling more than 12 per cent over the 1935 finals. These figures, embracing both trade and industrial sales, reveal, on closer inspection, that industrial outlets provided the greater gain—probably over 15 per cent when data are complete. Lacquer manufacturers can point to a lion's share of the market with industrial sales in the neighborhood of twenty per cent larger than in 1935. How optimistic is the outlook may be gathered from the forecasts of well informed observers who predict a record year for 1937.

An important factor contributing to the strong position of lacquer was the

(Continued on next page)

U. S. I. DEVELOPS NEW SAMPLE CONTAINERS

When U. S. I. introduced its striking new container for shipping liquid samples recently, the search for the elusive bottle through piles of sawdust in the bulky, desk-scratching, wooden box became a thing of the past. For many years chemical buyers have been awaiting a compact and modern sample shipping container which could be opened on a desk along with routine mail.

Although essentially a simple design, much tedious research was necessary to devise a package which would be practical and could be sent by parcel post.

From four ounces to quart samples of many U. S. I. products may be mailed readily in glass bottles in the new packages, thus materially reducing transportation charges and the costly shipping boxes. A light, metal can with a safe, triple-tight seal replaces the old unwieldy box. Instead of the messy sawdust which has plagued recipients heretofore, U. S. I. uses a fluffy, clean, highly-absorbent cellulose filler to protect the bottle.

An attractive utility label, decorated with green and white stripes, lists U.S.I. products. By means of a novel design one label may be adapted to fit the 4-oz., 8-oz., pint and quart size containers.

NEW SAMPLE CONTAINERS

Convenience and cleanliness is the keynote of U. S. I.'s new containers for shipping samples of U. S. I. products permitted under Postal Regulations. The cellulose filler wrapped around the bottle has an absorbent capacity many times its own weight. The four containers shown illustrate how one label is adapted to fit all sizes.

February ★ SOLVENT NEWS ★ 1937

USE THERMOPLASTIC RESIN TO MAKE "FEATHERWEIGHT" PIPES

Thermoplastic pipes less than one-fifth as heavy as iron pipes of equivalent dimensions are the latest competitor of glass, iron, stainless steel and earthenware pipes for the carrying of acids, alcohol, brine, formalin and even beer. Reported from abroad, the new pipes are also notable for unusual facility in installation.

They may be sawed, formed and bent with everyday tools. When it becomes necessary to make a joint, this is done by the simple expedient of heating the end of one to 80 deg. C. and inserting a cold end of the other. A tight shrink fit is produced. Flanges may be formed out of the end of the pipe itself.

SEE BIG GAINS FOR SOLVENT CONSUMING MARKETS IN 1937

(Continued from preceding page)

larger automobile production in 1936. Producing over 4,600,000 units, the industry exceeded 1935 figures by 12 per cent. The new total was, in fact, about equal to 1928 production, the output that was heretofore the industry's second highest annual record. With an increase in automobile output of at least 10 per cent in prospect for 1937, lacquer manufacturers may expect a still heavier demand from this quarter.

Rayon manufacturers, important solvent consumers, produced about 10 per cent more than in 1935 and a record year is in sight for 1937 with productive capacity stepped up by significant margins. Although the cellulose xanthate process still bulks largest in the picture, cellulose acetate appears to be making the greater gains, a fact which should be reflected in a heavier volume of alcohol and acetone sales.

Pyroxylin spread production, an index to the manufacture of pyroxylin coated textiles, was 20 per cent greater than in 1935. With the greater promotion that these products are now receiving, it is evident that consuming markets for artificial leather, waterproof fabrics, etc. are being greatly broadened.

Plastics, now nearly as ubiquitous as wood, made significant strides in 1936. Cellulose acetate plastics production alone registered a gain of 27 per cent over 1935.

The chemical industry as a whole provides the best summary of the current outlook with a rise of 14 per cent over 1935, and leaders are predicting a further gain of at least 10 per cent in 1937.

W. W. Davis, nephew of the late James A. Webb and salesman for the U. S. I. subsidiary, James A. Webb and Son, for 56 years until his retirement in 1934, died Jan. 12 at his home in Madison, N. J. Mr. Davis was born Feb. 11, 1861.

Solox Prevents Formation of Ice on Plane Propellers

To prevent the formation of ice near the hub of airplane propellers the Chicago & Southern Airlines, Robertson, Mo., is using a solution consisting of 85 per cent Solox and 15 per cent glycerine. Solox is the proprietary alcohol-type solvent made by the U. S. Industrial Alcohol Co.

Gravity feed is used to convey the solution from a reservoir tank in the motor housing through the propeller shaft into a small trough around the hub of the propeller. As the propeller whirls, centrifugal force throws the fluid out through a small outlet to the propeller surface.

When fairly heavy coatings of ice form on the propeller, close to the hub, large pieces may break loose and crash into the fuselage or engine housing. Sometimes a "chunk" may break off one blade, leaving ice on the other blade or blades, which causes excess vibration. The trouble is experienced at the hub only, and under humid conditions with the temperature between 28 and 34 deg. according to reports.

J. W. DUNN RETIRES

Known for many years as Number One salesman for Industrial Alcohol in the middle west, John W. Dunn, Detroit Division Manager of the U. S. Industrial Alcohol Co., retired January 1, 1937 after 18 years of loyal service. Just prior to Mr. Dunn's retirement, Mr. Fred Henley of the U. S. Industrial Alcohol Co.'s Chicago office sales staff was promoted to succeed him.

TECHNICAL DEVELOPMENTS

Heat indicating paints which will change color when exposed to heat have been announced. Five paints which change color permanently at temperatures ranging from 300 deg. F. to 734 deg. F. and seven retroactive paints which change color in ranges from 122 deg. F. to 464 deg. F., returning to original color, are available.

U S I

Plastic sealing material for glazing, pointing, caulking, coating canvas, etc., is said to be water-, weather- and vibration-proof. It consists of aluminum powder in a plastic vehicle which, on setting, forms a metallic surface film over the remaining plastic material.

U S I

Improved liquid sulphur for producing oxidized finishes on copper and silver is claimed by a manufacturer. Almost any shade of finish from a true blue to a blue black may be obtained by controlling the strength of the solution, temperature, etc.

U S I

Fast, economical dissolving is claimed for a Dissolver recently announced. The new machine can be used for cutting nitrocellulose, dissolving resins of all kinds, dispersing pigments, etc., according to the manufacturer.

U S I

Zinc coating material for repairing damaged galvanized surfaces is available in powder and liquid form. It is stated that the powdered material forms a bond at 275 deg. F. to 300 deg. F. and that the resultant coating is equivalent to that in an original zinc coating.

U S I

Emulsions of water and oils may be formed with a neutral, free-flowing liquid recently placed on the market. It is described as having the unusual property of being completely soluble in either mineral spirits or water.

U S I

A new liquid coating material is said to form a heat-resisting, flexible film on metallic, glass and other surfaces. The maker states that the material is suitable for coating the inside of metal containers, collapsible tubes, etc. The coating can be applied by brushing, spraying or spreading.

U S I

A folder giving the history of industrial alcohol, its industrial uses, a pictograph of alcohol manufacture, and a summary of government regulations may be secured by writing to U. S. I.

A subsidiary of National Oil Products, Metasap Chemical, will manufacture metallic soaps in one of the buildings.

The property taken over was formerly used by United States Finishing, which has centralized its operations in Hartsville, S. C. The new Cedartown plant will be second in size only to the Harrison, N. J., plant, and, ultimately, may be larger. Other offices and plants are maintained by the company in Chicago, Boston, San Francisco, Portland and Seattle. The company also operates an extensive experimental farm near Flemington, N. J. C. P. Gullick is president.

Walter Kastner will be brought from the Chicago plant and made works manager at Cedartown, while Foster Jones, from the main office at Harrison, will be in charge of the office force.

Household Specialties

Federal Trade Commission Last Month

Allen B. Wrisley Co., Chicago, is alleged to have advertised certain soaps as olive oil soaps, when in fact the oil or fat ingredient of these products was not entirely olive oil.

Use of unfair trade practices in connection with the sale of soap, which it represents to be olive oil Castile and of Spanish origin, when such is not a fact, is alleged by the Commission in a complaint issued against Babiglo Co., 37 W. 20th st., N. Y. City.

Albert S. Braaten, 4 4th st., South, Moorhead, Minn., trading as More-X Graphite Co., engaged in compounding an auxiliary lubricant with a collodial graphite base, intended to be added to ordinary lubricating oils and motor fuel oils, agrees to stop advertising that by use of "More-X," friction has or can be reduced as much as 50%.

Flori Mothproofing Method, Inc., 252 S. Broad st., Philadelphia, is charged in a complaint with unfair methods of competition in connection with the sale of "Flori," a liquid preparation for use on garments, rugs, furniture and other articles as a protection against moths, carpet beetles, and insects.

Merchandising, Advertising Plans

Colgate - Palmolive - Peet recently launched "concentrated" Super Suds in 104 newspapers and a radio program.

Fels & Co., Philadelphia has started a two-a-week, daytime network program for Fels Naphtha Soap.

L. J. Gumpert, director of sales, B. T. Babbitt, Inc., has announced that advertising expenditures for Bab-O this year would be increased practically 100%. Radio stations will be added to the company's daytime program and tie-ups, with newspaper space arranged in some 75 cities. In addition, the company plans an extensive small-town campaign on its many brands of lye.

Meanwhile, it is announced that P. & G's Ivory soap contest will include two radio programs, 11 women's and general magazines, a radio fan paper, a newspaper magazine in 21 cities, and 20 large city newspapers. Sixty Pontiac cars are major prizes.

Larvex, with an increased advertising appropriation for 1937, will use newspapers in key cities and 10 magazines and has established a special fund for cooperative advertising with dealers.

Colloidal Starch As A Detergent

High detergent efficiencies are claimed for colloidal starch solutions by a French chemist, Dr. L. Zakarias. Apparently the colloidal starch solutions alone are not very efficient, but become so when treated with about 2% of their weight of sodium carbonate. When such a solution is used for degreasing metals, the free alkali is progressively exhausted by interaction with the oily and fatty materials and requires periodical renewal. The main mass of the starch solution only deteriorates very slowly in use, since it is not, as in the case of saponaceous detergents, contaminated by the presence of the emulsified fats produced in use. *Chimie et Industrie,* Dec., '36.

New Household Chemical Specialties

After two years of research the Von Schrader Manufacturing Co., Racine, Wis., has placed on the market a new machine for cleaning furniture and automobile upholstery. A special detergent is employed.

J. A. Tumbler Laboratories, Baltimore, is introducing several new lines, including potash soap and several sanitary specialties.

Lever Brothers is introducing "new 1937 Rinso," said to give "25 to 50% more suds." The "greatest advertising campaign in Rinso history" will include newspapers, magazines, trade papers and two network shows.

What the Specialty Companies Are Doing

Stone & Weaver, Leaksville, N. C., has been formed to manufacture a specialty cleaner. Company is also prepared to act as selling agents in the south for manufacturers of specialties.

Clark-Dunn Manufacturing, St. Louis manufacturer of shoe polishes and dyes is being dissolved.

The J. I. Holcomb Manufacturing Co., Indianapolis, Ind., manufacturer of cleaning materials, has purchased a much larger plant and additional property for expansion.

Purdue Fumigating Course A Success

The short course for fumigators and exterminators conducted at Purdue University last month attracted a registration of 79, far exceeding the expectations of the committee in charge. The cooperative program was worked out by the National Association of Exterminators & Fumigators and the Department of Entomology of Purdue with Prof. J. J. Davis in charge. All past presidents and present incumbent of the National Association of Exterminators and Fumigators attended the course at Purdue.

The National Association of Exterminators and Fumigators through Harry J. Hammond, general chairman of the National Convention Committee, announces that the 5th Annual Convention of the Association will be held at Hotel Peabody, Memphis, Tenn., Monday, Tuesday and Wednesday, Oct. 25-26-27th.

Personal News Items

William O. Buettner, secretary, National Association of Exterminators & Fumigators, is on an extended trip as far as the Coast contacting members of the association.

Herbert F. Johnson, Jr., president of S. C. Johnson & Sons, Inc., Racine, Wis., was married Dec. 31st in Racine to Mrs. Jane Roach, Madison, Wis.

Agricultural Specialties

Study of the Toxicity of Lead and Arsenic

At the request of Secretary of Agriculture Wallace, the National Academy of Sciences, through its president, Dr. Frank R. Lillie, has appointed a committee of nationally-known scientists to review the research program of the toxicity of lead and arsenic now under way in the Food and Drug Administration.

New Ingredients For Horticultural Sprays

Michael Export Co., New York, reports that two patented products, "Superin DN" and "Superfix DF," are used in Europe as ingredients of horticultural sprays. Sprays reinforced with these products do not settle in drops and are not washed off easily by rain. Use of "Superin DN" gives better dispersion properties, it is stated, while with the use of "Superfix DF" the penetration properties of sprays are improved so that they will penetrate small crevices.

Packaging, Handling and Shipping

Paper Service Plant Unharmed by Flood

The Paper Service Co., manufacturer of barrel liners, with its factory at Lockland (Cincinnati), kept the wheels of its plant going all through the flood period with the aid of gasoline-driven tractors and big steam driven-threshing engines. The factory is located well away from the actual flood area, but when the power failed, outside sources were hurriedly assembled.

Wilson & Bennett Employees Get Bonuses

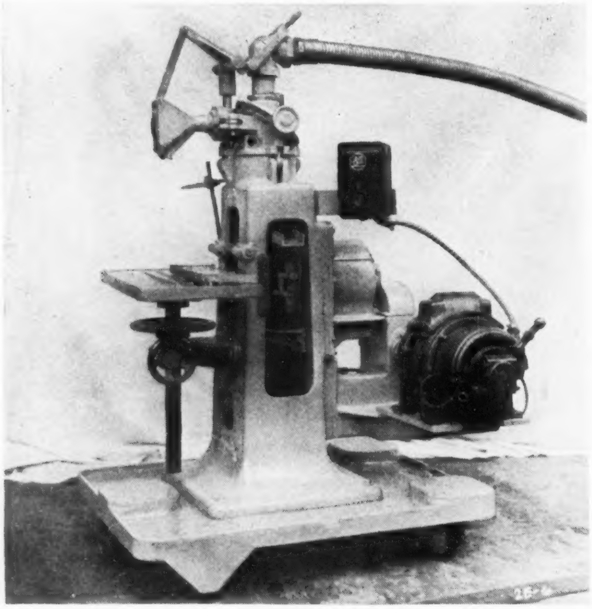
Employees of Wilson & Bennett Mfg. Co. (steel pail and drum manufacturers) were exceptionally well remembered at Christmas time, according to information just received from S. A. Bennett, president of the company.

Everyone in the entire organization (at Chicago, Jersey City and New Orleans plants) was given a fine deluxe turkey. All employees who have been with the company for two years or more were given substantial bonuses, based upon the length of time they have been in the company's employ, and their salary.

Executives, office employees and plant foremen and key men—who have been with the company for 6 months or longer—were presented with $1,000 Life Insurance policies—the entire initial and subsequent premiums on which are paid by the company.

New Can Filling Device

For accurate filling of chemical specialties, paint, varnish, shellac, oil, grease and other similar liquid or semi-liquid materials into jars and cans, the Stokes Simplex filling machine has numerous advantages, according to the manufacturer.



Among these are easy cleaning and "change-over" after a run of given material, making the machine practical for use with a variety of products. The machine can be adjusted to fill 30 to 40 containers per minute from 1/32 gallon (4 ounces) capacity up to 1 quart and has an automatic attachment for making multiple strokes for filling larger sizes. Full details may be secured from the manufacturer, The F. J. Stokes Machine Co., Philadelphia.

Feb. 10th Last Day for Wolf Awards Entries

Entry forms and entry fees in the 6th Annual Competition for the Irwin D. Wolf Awards in packaging, according to the American Management Association, the sponsor, should be sent to the Irwin D. Wolf Awards Administration, Room 1605, 232 Madison av., N. Y. City. Packages should be sent to reach the same address not later than Feb. 10.

Packages will be judged on Feb. 18th while presentation of the awards will be made in conjunction with the 7th Packaging Exposition at the Pennsylvania, N. Y. City, March 23 to 26th.

Gair Acquires Two Companies

Robert Gair has acquired the business, equipment, and inventory of the Pa Pro Co., Utica, N. Y., and Holyoke Fibre Box, Holyoke, Mass. The two corrugated shipping container units will be operated as the Pa Pro Containers Division and the Holyoke Fibre Box Division of Robert Gair.

Of Interest to Shipping Executives

The current issue of *Shipping Management* contains two specially interesting articles to shipping executives. The first is on "Platforms and Skids," by Matthew W. Potts, and the other on "Proper Insertion of Liners, for Bag, Box, Drum, etc.," by a member of the staff of the Paper Service Co.

Protective Clothing

Workmen in chemical plants manufacturing mineral acids and corrosive and poisonous substances and those who use such products are in need of special protective clothing to safeguard them from chemical burns. This important personal safeguard for chemical workers is met by the application of a vulcanizable dip coating of specially compounded rubber latex upon the exterior of such garments as overalls, jumpers, dungarees, pants, gloves, mittens, etc.

The process of proofing is known as Safetex and affects only the outside, leaving the body side of the garment as warm, dry, soft, and flexible as before treatment. No cold or sticky surface can come in contact with the wearer's skin. Safetex Co., Inc., is the maker and is located at 12-14 W. 21st st., N. Y. City.

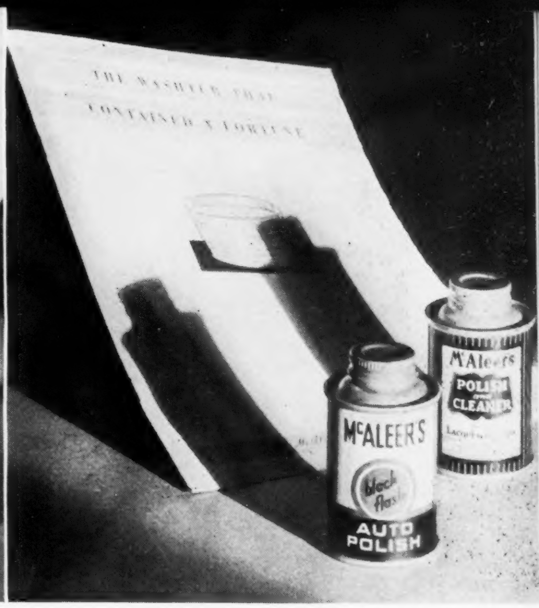
I. C. C. Authorizes Bulk Salt Rate

The I.C.C. has authorized conditionally a rate of 16c per 100 lbs. on bulk salt in carload lots from Retsof and Ludlowville, N. Y., to Hopewell, Va.

Rates would be effective only during the season of navigation on the N. Y. State barge canal. Order continues rates established June 1, 1936, in order to permit the western New York salt mines to meet foreign competition in supplying salt to Solvay Process.

Kentucky Trade-Mark Bill is Dead

Kentucky House Bill No. 15, providing for a State registration of trade-marks, has been killed so far as this session of the legislature is concerned. Senate Bill No. 15, the companion bill, is still alive but it is thought no action on this legislation will be taken this session.



New containers by Phoenix Metal Cap. Left, Lubri-Tasgon, super-lubricant distributed by the Wilbur & Williams Co., N. Y. City. Right, a few of the specialties produced by McAleer Manufacturing.

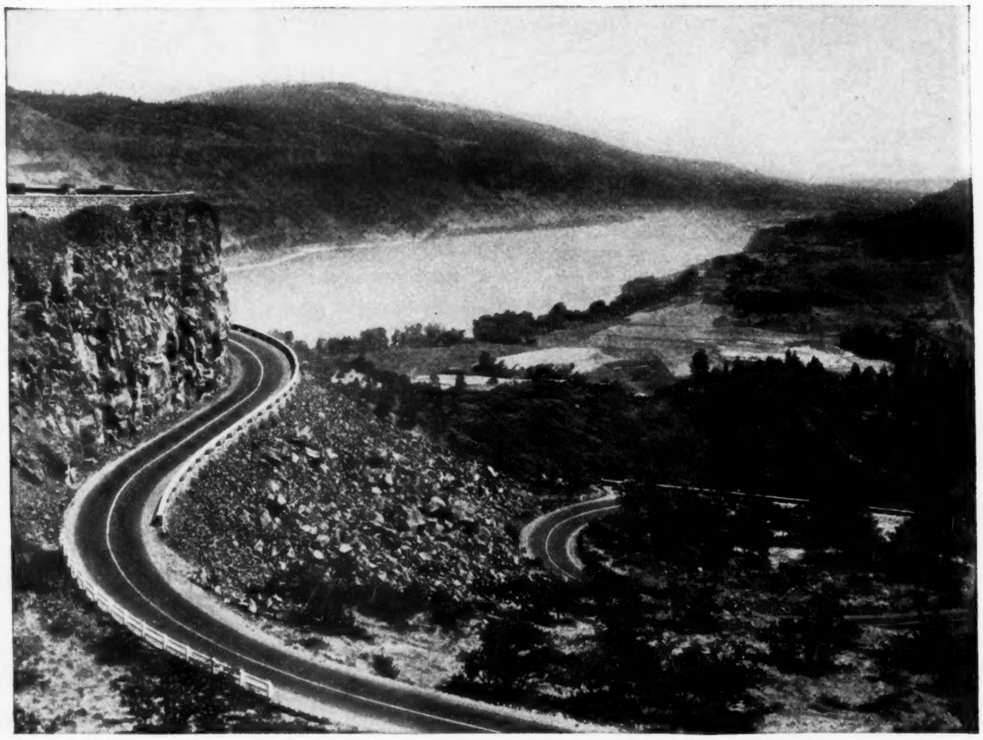
New Products— New Packages

Second prize in the 4th annual "5 & 10" Packaging Show, conducted by The Syndicate Store Merchandiser, was won by Wilbert's NO-RUB Shoe White container.

Turpentine & Rosin Factors, Inc., Jacksonville, Fla., is making a special sales effort to increase retail outlets and has had this attractive container designed.

American Disinfecting, Sedalia, Mo., is packaging its "Ram" paste soap in a new container. The purchaser has a very useful pail when the contents have been used.

COLUMBIA



PERFORMANCE

Photos courtesy
"U.S. Bureau of Public Roads"
"Oregon State Highway Commission"

THE Columbia River Highway, called "America's Greatest Boulevard", is unsurpassed anywhere for scenic grandeur and as a triumph of engineering skill.

Unsurpassed too, is the long continued performance of the COLUMBIA ALKALI CORPORATION in serving industry with unvarying quality products in the alkali field.

Recently, Liquid Chlorine and Sodium Bicarbonate have been added to the line. Produced under ideal conditions at the Barberton plant, these new members of the Columbia family already have given adequate evidence of matching Columbia's enviable performance record.

Make your products better and your problems fewer by specifying COLUMBIA.

COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
CALCIUM CHLORIDE
LIQUID CHLORINE

THE COLUMBIA ALKALI CORPORATION

EXECUTIVE SALES OFFICES 30 ROCKEFELLER PLAZA • NEW YORK, N. Y.
Branch Sales Offices • BARBERTON, OHIO • 431-451 ST. CLAIR STREET, CHICAGO
CAREW TOWER, CINCINNATI • GRANT BLDG., PITTSBURGH • Plant at Barberton, Ohio

New Trade Marks of the Month

365,398
LACQUER-TONE
365,399
Lacquer-Tone
370,749
DIAZOCEL
372,662
MIKROKLENE
372,995
PURE
373,883
Midway
377,811
CREAM O' PENN
374,203
NATIONAL LITHOGLAZE
374,909
MOTOR THERMALIZED KREEMOIL
376,573
CEDERIT

377,672
48 GOOD IN EVERY STATE
377,872
SPRAYONE
378,289
HEX-OFF
378,292
SOLVOID
378,293
AMPCO SOLVOID LIQUID CLEANSER
378,461
SURE-LUBE
381,229 and 381,231
Midway

378,531
SUNOCO TRANSEP
378,870
Lustor
380,786
Sweet Georgia Brown
381,557
NAPTOL CLEANING CRYSTALS
382,087
CLEANPRINT UNIT
382,865
PIROKILL INSECTICIDE
382,982
KAK
383,279
BONDLITE
383,136
LUXOL Add a Touch of Luxury
383,528
LUBREX

Trade Mark Descriptions†

365,398. Union Oil Co., Los Angeles; May 25, '35; automobile polish; use since July, '34.
365,399. Union Oil Co., Los Angeles; May 25, '35; cleaner for lacquered and enameled surfaces; use since July, '34.
370,749. American Aniline Products, N. Y. City; Oct. 24, '35; organic dyestuffs for celanese and acetate silks; use since Oct. 4, '35.
372,662. Economics Laboratory, Inc., St. Paul; Dec. 16, '35; cleaning compound for all types of hand washing; use since May 1, '35.
372,995. The Pure Oil Co., Chicago; Dec. 23, '35; automobile radiator cleaner and compound for stopping radiator leaks; use since Dec. 20, '34.
373,883. Midway Chemical Co., Chicago; Jan. 20, '36; insecticides, rodent exterminators, bluing, ammonia, and other miscellaneous chemical specialties; has been in use for different periods of time on each chemical.
377,811. United Refining Co., Warren, Pa.; Apr. 29, '36; gasoline, lubricating oils and greases; use since Mar., '36.
374,203. National Potteries Co., Minneapolis; Jan. 28, '36; chemical mixture for decorating walls, pottery, concrete, etc.; use since May 25, '34.
374,909. Scientific Oil Corp., Indianapolis; Feb. 15, '36; lubricating oil; use since Feb. 1, '36.
376,573. Cederit Co., San Francisco; Mar. 30, '36; wall coating preparation for moth control; use since Feb. 17, '36.
377,672. Peter David (Peter David Leather Dressing Co.), Seattle, Wash.; Apr. 27, '36; oil dressings, cleaners, and polishes for leather; use since Feb. 26, '36.
377,872. Helen A. Caldwell (Caldwell Chemical Co.), Seattle; May 1, '36; insecticide containing rotenone and derris extracts; use since Apr., '34.
378,289. Cornell-Davis Laboratories, Detroit; May 11, '36; type cleaner and ink-removing preparation; use since Nov. 30, '35.
378,292. American Marine Paint Co., San Francisco; May 11, '36; water softener; use since June, '35.
378,293. American Marine Paint Co., San Francisco; May 11, '36; water softener; use since June, '35.
378,461. Sure-Lube Refinery, Louisville, Ky.; May 14, '36; lubricating oils; use since Sept. 1, '33.
381,229. Midway Chemical Co., Chicago; July 20, '36; polishes, waxes, putty, paint, etc.; has been in use for different periods of time on each chemical.
381,231. Midway Chemical Co., Chicago; July 20, '36; machine oil; use since Sept 30, '27.
378,531. Sun Oil Co., Philadelphia; May 16, '36; lubricating oils and lubricating greases; use since Aug. 27, '35.
378,870. Julius Lustig (Lustor Mfg. Co.), San Jose, Calif.; May 25, '36; felt hat cleaner; use since Feb. 1, '35.
380,786. Morton G. Neumann (Valmor Products Co.), Chicago; July 8, '36; toilet soap; use since Feb. 1, '27.
381,557. Chempro Mfg. Co. (Chempro), N. Y. City; July 29, '36; household cleanser; use since July 1, '36.
382,087. Cleanprint, Inc., N. Y. City; Aug. 12, '36; spraying liquid to aid in printing and lithographing; use since Mar. 24, '36.
382,865. Alfredo Cordero, N. Y. City, and Ponce, Puerto Rico; Sept. 3, '36; insecticides; use since '25.
382,982. Lyman Chalkley (Photoy Products), Bay Shore, N. Y.; Sept. 1, '36; plant hormones for horticultural use; use since May 21, '36.
383,279. The Wilbur & Williams Co., Boston; Sept. 15, '36; oil paste paint; use since July 1, '36.
383,136. Napthole, Inc., N. Y. City; Sept. 11, '36; chemical preparation for use as a starch lubricant in the laundry; use since Feb., '35.
383,528. Curtis J. Harwick (Standard Chemical Co.), Akron, Ohio; Sept. 23, '36; powdered material to prevent adhesion in rubber vulcanizing molds; use since Jan. 1, '36.

Chemical Specialty Patents*

Method of preparing water softening cleanser from 40 to 65 parts by weight of soap-making fatty acids, 35 to 40 parts by weight of sodium sesqui-carbonate and 2 to 10 parts of tri-sodium phosphate. No. 2,065,117. Bert O. Crites, University Heights, to The Climalene Co., Canton, Ohio.

Pipe thread lubricants containing a major amount of a petroleum lubricating base, a lubricating metallic powder and a sulfur containing compound such as a sulfurized fatty ester. Nos. 2,065,247, and 2,065,248. Herschel G. Smith, Swarthmore, to Gulf Oil Corp., Pittsburgh.

Cement for joining ceramic and metallic materials consisting of a mixture of water glass solution, finely divided alumina and a silicofluoride. No. 2,065,389. Arthur Mohrle to Robert Bosch A. G., both of Stuttgart, Ger.

Constructional material comprising a vehicle saturated with bituminous saturant containing a solvent and coated with a slow-drying, tacky substance. No. 2,065,439. Albert C. Fischer, Chicago, to The Philip Carey Mfg. Co., Ohio.

Method of liberating fatty acids by the reaction of strong acid with soap at a suitable temperature. No. 2,065,520. Eddy W. Eckey, Wyoming, and Charles C. Clark, St. Bernard, Ohio, to The Procter & Gamble Co., Cincinnati.

Gum inhibitor for hydrocarbon fuels. No. 2,065,568. Harold Walter and Herbert W. Walker, to Gasoline Antioxidant Co., all of Wilmington, Del.

Grease composition comprising a homogeneous mixture of a mineral oil, 5 to 20% of a calcium soap of a high molecular weight fatty acid and up to 0.4% of an organic aryl compound, the aryl compound preventing the separation of the oil. No. 2,065,857. William P. Hilliker, Hammond, Ind., to Standard Oil Co. (Ind.), Chicago.

Grinding wheel comprising an abrasive body cemented rigidly to a backing plate by an intermediate cementitious medium including a layer of vulcanized soft resilient rubber and a layer of sodium silicate. No. 2,065,941. Merton B. Lane, Holden, Mass., to Norton Co., Worcester, Mass.

Grinding wheel comprising an abrasive body cemented rigidly to a backing plate by an intermediate cementitious medium including a layer of vulcanized soft resilient rubber and a layer of converted resinoid. No. 2,065,942. Merton B. Lane, Holden, Mass., to Norton Co., Worcester, Mass.

Box toes for shoes comprising an absorptive base impregnated with a composition including chlorinated rubber, paraffin and a resin. No. 2,066,117. Evart E. Mayfield to Hercules Powder Co., both of Wilmington, Del.

Process for manufacturing mixed ethers of higher alcohols with polar groups and application of the same for textile purposes. No. 2,066,125. Meindert Danius Rozenbroek, Delden, Twenthe, Overijel, Netherlands.

Lubricant assistant comprising 1 to 5 parts of a nitro aromatic compound in combination with 0.3 to 2 parts of an amine of the group consisting of aromatic and aliphatic amines and reaction products thereof. No. 2,066,173. Wil-

Specialty Patents concluded on next page.

* Patents covered in this issue include those appearing in the *U. S. Patent Gazettes*, December 22 to January 19.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, December 22 to January 19.

Specialty Patents (Continued)

liam Stansfield Calcott, Woodstown, and Robert Calvert McHarness, Carneys Point, N. J., to du Pont, Wilmington, Del.

Insecticide and insect repellent comprising a hydrogenated extract of petroleum oil and the active principles of a fish poisoning plant. No. 2,066,184. Louis A. Mikeska, Elizabeth, N. J., to Standard Oil Development Co., Del.

Solid soap composition comprising 65-95% of an alkali metal soap of a fatty acid, 5-25% of a hydrocarbon liquid and 0.5-10% of sulfonic acid salts derived from mineral oil acid sludge. No. 2,066,208. John B. Lewis, Cranford, N. J., and John C. Bird, Germantown, Pa., to Standard Oil Development Co., Del.

Stable lubricating composition. No. 2,066,-216. Floyd L. Miller, Roselle Park, N. J., and Arnold J. Morway, N. Y. City, to Standard Oil Development Co., Del.

Lubricating oil consisting of a hydrocarbon oil containing a small amount of chlorinated diphenyl benzol. No. 2,066,354. Bert H. Lincoln and Alfred Henriksen, deceased, both of Ponca City, Okla., Henriksen by Ellen M. Henriksen, Perry, Okla., to The Lubri-Zol Development Corp., Cleveland.

Fuel briquette containing 66 2/3% bituminous coal, 20 5/6% wood pulp paper, and 12½% asphalt. No. 2,066,457. Alden J. Decker, Du Bois, Pa.

Method of making detectable marks containing fatty substance such as fingerprints visible by treating with a fat fixative and a dye which fluoresces in ultra-violet light. No. 2,066,535. Francis F. Lucas, East Orange, N. J., to Bell Telephone Laboratories, N. Y. City.

Method of making an extract of pyrethrum flowers in petroleum distillate for insecticidal purposes. No. 2,066,737. Irving E. Muskat, to Gulf Research & Development Co., both of Pittsburgh.

Resinous adhesive and process of making the same. No. 2,066,857. Charles E. Rozema, Grand Rapids, and Jacob H. Tigelaar, Jamestown, Mich., to Reconstruction Finance Corp.

Water-soluble seed disinfectant. No. 2,066,-895. Karl Memminger to Fahlberg-List A. G. Chemische Fabriken, both of Magdeburg-Sudost, Ger.

Insecticidal composition containing the reaction product between nicotine and humic acid or peat. No. 2,066,941. Louis N. Markwood, Washington, D. C., to the Public.

Composite building material comprised of a compressed mixture of a finely divided woody substance containing natural resin, a synthetic resin, and lime. No. 2,067,012. Emil C. Loetscher, Dubuque, Iowa.

Fibrous mass having incorporated therein an insecticide and a fungicide formed from hydrocarbons of the general formula $C_{14} H_{10}$, creosote and its homologues, and pyridin-like substances. No. 2,067,047. George H. Ellis, St. Paul, to The Insulite Co., Minneapolis.

Manufacture of shoe stiffener material from a textile fabric and an organic stiffening agent. No. 2,067,239. Winthrop M. Mayo, Leominster, and Stanley P. Lovell, Newton, Mass., to Beckwith Mfg. Co., Dover, N. H.

Paste polishing material comprising the wax-like residue remaining from bleaching and dewaxing of crude shellac mixed with suitable emulsifying agents and a fatty acid. No. 2,067,-297. Lawrence R. Van Allen, Chicago.

Compositions for use in removing fibrous layers attached to surfaces by an adhesive. Nos. 2,067,326 and 2,067,327. Martin Leatherman, Hyattsville, Md.

Fluid cleaning composition consisting of 88 to 50% of a dichlorobutane mixed with 12 to 50% of a liquid organic grease solvent. No. 2,067,-355. Leo V. Steck, Oakland, to Shell Development Co., San Francisco, Calif.

Composition for preventing vapor lock in internal combustion engines consisting of kerosene, oil of mirbane, oil of creosote, turpentine, oil of cedarwood and camphorated oil. No. 2,067,384. John Howard Essick, Erie, Pa.

N-long chain aryl aromatic amino sulfonic acids which may be used as penetrating—,wetting out—,and cleansing agents. No. 2,067,463. Erik Schirm, Dessau-in-Anhalt, Ger., to "Unichem" Chemikalien Handels A. G., Zurich, Switz.

Preparation of insecticide and fungicide compounds. No. 2,067,532. Joseph Hidy James, Pittsburgh, to C. P. Byrnes, Sewickley, Pa.

Fertilizing device comprising a wooden spike impregnated with a mesothorium solution which may be driven into the ground adjacent to the roots of a plant. No. 2,067,589. Louis C. Antrim, N. Y. City.

Sheet constructional material composed of fiber, dense waterproofing mastic and a slow drying sticky adhesive. No. 2,067,707. Albert C. Fischer, Chicago, to The Philip Carey Mfg. Co., Ohio.

Waterproof concrete comprising hydraulic cement, aggregate and a dispersion of asphalt in water with soap as the dispersing agent. No. 2,067,772. Harold L. Levin, Rutherford, N. J., to The Patent and Licensing Corp., N. Y. City.

Composition for etching glass. No. 2,067,925. Nance Clayton-Kennedy, London, Eng.

379,339 MAZEL KOSHER CLEANSER

383,404 PAYSONTHETIC

383,451 OLD SPICE

383,537 MYRIAD

383,576 CEMENSLAG

383,579 CEMENCINDER

383,619 ACOUSTICK

383,651 FORMVAR

383,711 KOPPEL

379,753 TUNG-TONE FINISH

383,796 SHADOW KID

383,798 USA-FOAM

383,910 LESTOIL

383,914 LUSTEREX

383,992 DRAIN-ZIT

383,725 COSMIC METAL CLEANER & POLISHER

384,033 WESCO

384,128 THERMOFLO

384,141 GOLD FILM

384,168 SUMMITLUBE

384,310 QUADINE

384,349 Freezoff

384,424 KURLTEX

384,475 ZEO-KARB

384,566 BENZO-SOL

384,171 Vapo BUBBLES

384,498 ADENT

384,513 THURMO

384,567 TOLU-SOL

384,571 FABRICOL

384,727 HALLMARK

384,750 EVER-NU

384,582 DERBY Vitalized

Descriptions

379,339. Michael Feinberg (Feinberg Kosher Sausage Co.), Minneapolis; June 5, '36; household cleaner; use since Sept., '35.

383,404. The Payson Varnish Co., N. Y. City; Sept. 18, '36; paints, varnishes, etc.; use since Aug. 31, '36.

383,451. Shulton, Inc., N. Y. City; Sept. 19, '36; shaving soap, toilet soap, etc.; use since Aug. 26, '36.

383,537. Les Parfums Chypron Societe Anonyme, Courbevoie/Seine, Fr.; Sept. 23, '36; toilet soap, shaving soap, etc.; use since Jan. 16, '36.

383,576. Albert Henderson, Pittsburgh; Sept. 24, '36; construction members incorporating Portland cement and slag aggregate; use since Aug. 12, '36.

383,579. Albert Henderson, Pittsburgh; Sept. 24, '36; construction members incorporating Portland cement and cinder aggregate; use since Aug. 12, '36.

383,619. Charles L. Gane (Atlas Supply Co.), Philadelphia; Sept. 25, '36; waterproof adhesives and cements; use since Dec., '31.

383,651. Shawinigan Products Corp., N. Y. City; Sept. 25, '36; synthetic resinous material; use since Mar. 29, '33.

383,711. Koppel Industrial Car and Equipment Co., Koppel, Pa.; Oct. 23, '36; fertilizer and fertilizer materials; use since Jan., '24.

379,753. F. A. Lifter (Florian Products Co.), Newark, N. J.; June 15, '36; paints, varnishes, etc.; use since May 15, '36.

383,796. Allied Kid Co., Boston; Sept. 30, '36; shoe and leather dressings; use since July 10, '36.

383,798. B & L Laboratories, Inc., Chicago; Sept. 30, '36; saponaceous material; use since June 25, '36.

383,910. Jacob L. Barowsky (Adell Chemical Co.), Holyoke, Mass.; Oct. 3, '36; cleansing composition; use since Sept. 24, '36.

383,914. The Con-Ferro Paint and Varnish Co., St. Louis, Mo.; Oct. 3, '36; paints, varnishes, etc.; use since Sept. 9, '36.

383,992. Enoz Chemical Co., Chicago; Oct. 5, '36; drain pipe flush; use since Sept. 16, '36.

383,725. Cecil V. Dickson (Mosmic Products Co.), Oakland, Calif,; Sept. 28, '36; metal cleaning and polishing preparations; use since Sept. 10, '36.

384,033. Thomas Edwards (Westmoreland Oil & Gas Co.), Greensburg, Pa.; Oct. 6, '36; gasoline and kerosene; use since Aug. 1, '24.

384,128. Kema Products Corp., Chicago; Oct. 8, '36; anti-freeze liquid for internal combustion engine cooling systems; use since Sept. 4, '36.

384,141. Smith Oil & Refining Co., Rockford, Ill.; Oct. 8, '36; lubricating oils and greases; use since July 8, '36.

384,168. The Texas Co., N. Y. City; Oct. 9, '36; lubricating greases; use since Sept. 29, '36.

384,310. The Allen Co. (Quadine Laboratories), Toledo; Oct. 14, '36; fungicide for dogs and other animals; use since '34.

384,349. H. Kirk White & Co., Oconomowoc, Wis.; Oct. 14, '36; glass cleaner which prevents frost formation on windshields; use since Sept., '33.

384,424. Julius E. Kiefer, Milwaukee; Oct.

384,613
COP-NIC

384,636
SYNTHETIC WEBWOOD WOOD PRODUCTS

384,645
COLORIZER

384,726

384,754
IOFLOW

384,762
CUPRO-KK

384,783
TAT

384,811
SUPER-X

384,823
deb

384,824
THRIFCO

384,861
Padola

384,879
FORMADINE

384,880
LAVOSAL

384,881
SOLAMIDINE

384,903
KEMITROL

384,897
SKY LINE

384,918
RESIN "C"

384,939
CENEX

384,910
Wintersope

384,957
ORIGINAL OLD STYLE

384,960
SODOSIL

384,962
GULF

384,963
GULF

385,005
MARBON

384,981

Descriptions

16, '36; textile fibers curled by chemical treatment; use since July 15, '36.

384,475. The Permutit Co., N. Y. City; Oct. 17, '36; compounds for water purification and treatment; use since Sept. 29, '36.

384,566. Shell Petroleum Corp., St. Louis, Mo.; Oct. 19, '36; naphtha; use since '30.

384,171. Vapo Products Co., Spokane; Oct. 9, '36; glove and fabric cleaner; use since Sept., '34.

384,498. R. G. Binyon & Co., San Francisco; Oct. 19, '36; cleanser for artificial dentures; use since Dec. 1, '33.

384,513. Clara H. Churchill (Producers, Ltd.), Chicago; Oct. 19, '36; stop-leak preparation; use since Sept., '27.

384,567. Shell Petroleum Corp., St. Louis, Mo.; Oct. 19, '36; naphtha; use since '30.

384,571. R. R. Street & Co., Chicago; Oct. 19, '36; textile fabric cleaner; use since Mar. 30, '35.

384,727. The Hallmark Co., N. Y. City; Oct. 23, '36; silver polish; use since June, '15.

384,750. A. M. Ladd (Ever-Nu Laboratories), Los Angeles; Oct. 24, '36; liquid rubber cleanser and renewer; use since Oct. 12, '36.

384,582. The Derby Oil Co., Wichita; Oct. 20, '36; gasoline and motor lubricating oils; use since Oct. 10, '36.

384,613. Columbian Steel Tank Co., Kansas City, Mo.; Oct. 21, '36; copper nickel steel alloy sheets; use since Apr. 25, '36.

384,636. Webwood Corp., N. Y. City; Oct. 1, '36; plastic wood products; use since July 27, '36.

384,645. Bennett Glass & Paint Co., Salt Lake City; Oct. 22, '36; coloring material for paints; use since Oct. 10, '36.

384,726. Carl Wikstrom (P. Wikstrom, Jr.), Stockholm, Sweden; Oct. 23, '36; insulating and lining material; use since '33.

384,754. Mallinckrodt Chemical Works, St. Louis; Oct. 24, '36; mixture containing potassium iodide used for adding iodine to feeds; use since Oct. 13, '36.

384,762. Rohm & Haas Co., Philadelphia; Oct. 24, '36; plant fungicide; use since Oct. 8, '36.

384,783. Murray J. Bliss (Glass-Glow Co.), Indianapolis; Oct. 26, '36; liquid glass cleaner; use since Sept. 7, '36.

384,811. John M. Minnec (Super-X Cleanser Co.), Berwyn, Ill.; Oct. 26, '36; household cleanser; use since May 1, '36.

384,823. William F. Sudro (Western Products Co.,), Fargo, N. Dak.; Oct. 26, '36; silver polish; use since Sept. 1, '36.

384,824. Thrift Service Stations, Kingston, Pa.; Oct. 26, '36; gasoline and lubricating oils and greases; use since Sept. 1, '36.

384,861. Padola Corp., N. Y. City; Oct. 27, '36; brushless shaving cream, shaving cream, soaps, etc.; use since Apr., '36.

384,879. John Campbell & Co., N. Y. City; Oct. 28, '36; dyes and dyestuffs; use since '32.

384,880. John Campbell & Co., N. Y. City; Oct. 28, '36; dyes and dyestuffs; use since '31.

384,881. John Campbell & Co., N. Y. City; Oct. 28, '36; dyes and dyestuffs; use since '20.

384,903. National Milling & Chemical Co.; Philadelphia; Oct. 28, '36; laundry compound comprising soap and alkalies; use since Oct., '35.

384,897. Industrial Oil Corp., Warren and Stoneham, Pa.; Oct. 28, '36; lubricating oils and greases; use since Oct. 16, '36.

384,918. The Barrett Co., N. Y. City; Oct. 29, '36; resinous materials for use in waterproofing paper, cable insulation and compounding rubber, etc.; use since '23.

384,939. United States Rubber Products, N. Y. City; Oct. 29, '36; compositions consisting largely of rubber latex; use since July 21, '36.

384,910. Syndicate-Alliance Trading Co., N. Y. City; Oct. 28, '36; soap; use since Sept. 30, '36.

384,957. Chilean Nitrate Sales Corp., N. Y. City; Oct. 30, '36; nitrate of soda; use since Oct. 2, '36.

384,960. General Chemical Co., N. Y. City; Oct. 30, '36; detergents; use since Sept. 24, '36.

384,962. Gulf Oil Corp., Pittsburgh; Oct. 30, '36; furniture polish and auto wax; use since May, '25.

384,963. Gulf Oil Corp., Pittsburgh; Oct. 30, '36; insect killer, tick killer, live stock spray, etc.; use since July '25.

385,005. Marbon Corp., Chicago; Oct. 31, '36; adhesive; use since Sept. 15, '36.

384,981. Sunset Oil Co., Los Angeles; Oct. 30, '36; motor lubricating oils and gasoline; use since May 18, '36.

Specialty Patents (Concluded)

Thermo non-conducting packing material comprising a mass of asbestos fibers which have been treated with an insoluble soap. No. 2,068,019. Christian Gottwald, Cleveland Heights, to The Ric-Wil Co., Cleveland.

Mutual solvent for castor oil and mineral oil produced by heating a mixture of castor oil and naphthenic acids at a temperature of approximately 270° C. No. 2,068,088. Karl T. Steik, Upper Montclair, N. J., to National Oil Products Co., Harrison, N. J.

An emulsifiable solution of dry mahogany mineral oil soaps and an oil selected from the group consisting of paraffin oil and castor oil containing sulfur dioxide. No. 2,068,089. Karl T. Steik, Upper Montclair, and Julius F. Muller, New Brunswick, N. J., to National Oil Products Co., Harrison, N. J.

An indelible and fraud preventing ink for use on paper consisting of an aqueous solution containing a water soluble leuco ester salt of a vat dye. No. 2,068,204. Burgess W. Smith to The Todd Co., both of Rochester, N. Y.

Method of testing and restoring the effectiveness of detergent baths. No. 2,068,498. Franklin H. Mackenzie, Bywood, Pa., to American Chemical Paint Co., Ambler, Pa.

Gas odorizing mixture comprising essentially a mercaptan, a dye, and a stabilizing material consisting of alkylnitrosoamine. No. 2,068,614. Charles A. Thomas, Wayne, and Wilhelm Schmidt-Nickels, Philadelphia, to The Sharples Solvents Corp., Philadelphia.

Promising Insecticides

Out of the thousand or so potential insecticides that have come from the chemists' test tubes in the last few years, 3 or 4 now show definite promise as valuable aids to the farmer in his never-ending war on insect pests of crops, particularly fruit. None of them, however, can yet be recommended for general use. Further work must be done to iron out certain difficulties in the economical manufacture or practical application of each, according to Lee A. Strong, chief of the Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture. Most promising is phenothiazine, a compound of carbon, hydrogen, nitrogen, and sulfur that is easily prepared by combining diphenylamine—a common aniline derivative—and sulfur.

In the Northwest phenothiazine controls the codling moth—Number 1 apple insect pest—much better than lead arsenate, for

384,982

384,983

385,017
PROTOKOTE

385,018
ZEPHYR

385,047
COSMIC RAY

385,050

385,101
DIXIE

385,155
KEMKOTE

385,161
TREMLUX

385,145
DERBY

385,177
CRESCENT

385,185
TORRID-COTE

385,199
HYRATE

385,205
PENN-ACTION

385,217
POKADOT

385,268
RUG ROOT

385,271
GRAINAL

385,533
WHOPPER

385,564
VELVET

385,582
HOCOLOID

385,650

385,682
Care-free

385,813
Erustocide

385,815
Kleiglite

386,378
SAMSOLEX

386,119
WEARALOY

385,969
CAPYCO

385,855
ESSAR

Descriptions

384,982. Sunset Oil Co., Los Angeles; Oct. 30, '36; motor lubricating oils; use since May 18, '36.

384,983. Sunset Oil Co., Los Angeles; Oct. 30, '36; gasoline; use since May 18, '36.

385,017. United States Gypsum Co., Chicago; Oct. 31, '36; asphalt roof cement, asphalt root coating, etc.; use since Aug., '35.

385,018. United States Gypsum Co., Chicago; Oct. 31, '36; calcimine; use since Oct. 7, '36.

385,047. Los Angeles Soap Co., Los Angeles, Nov. 2, '36; toilet soap; use since Oct. 12, '36.

385,050. The Lowe Brothers Co., Dayton, Nov. 2, '36; varnishes, enamels, paints, etc.; use since Apr. 14, '36.

385,101. Jenco Brothers, Paterson, N. J.; Nov. 3, '36; adhesive cements; use since Mar. 1, '35.

385,155. Simplex Paper Corp., Adrian, Mich.; Nov. 4, '36; fiber boards; use since Oct. 1, '35.

385,161. The Tremco Mfg. Co., Cleveland; Nov. 4, '36; paint enamels; use since Sept. 1, '36.

385,145. Louisville Wall Paper Co., Louisville, Ky.; Nov. 4, '36; wall paper wheat paste; use since June 1, '35.

385,177. Corn Products Refining Co., N. Y. City; Nov. 5, '36; starch for manufacturing purposes; use since May 1, 1887.

385,185. The Glidden Co., Cleveland; Nov. 5, '36; lacquers, specifically cable coatings; use since Aug. 3, '36.

385,199. Plibrico Jointless Firebrick Co., Chicago; Nov. 5, '36; refractory cement; use since July 21, '36.

385,205. Valvoline Oil Co. (Penn Action Oil Co.), Cincinnati, N. Y. City, and Warren, Pa.; Nov. 5, '36; lubricating oils and greases; use since Aug. 27, '36.

385,217. William S. Dietrich (Pokadot Chemical Co.), Greenville, Pa.; Nov. 6, '36; furniture polish and cleaner; use since Mar. 21, '33.

385,268. The Specialty Guild, Convent, N. J.; Nov. 7, '36; powdered composition to keep rugs from slipping; use since Aug. 8, '36.

385,271. Vanadium Corp. of America, Bridgeville, Pa.; Nov. 7, '36; alloys to be added to ferrous and non-ferrous metals and alloys for controlling the grain size; use since Oct. 23, '36.

385,533. National Retailer-Owned Grocers, Inc., Chicago; Nov. 14, '36; laundry soap; use since Oct. 13, '36.

385,564. The Cleveland Cleaner and Paste Co., Cleveland; Nov. 16, '36; wall paper cleaner; use since Oct. 12, '36.

385,582. E. F. Houghton & Co., Philadelphia; Nov. 16, '36; colloidal clay for detergents; use since Nov. 5, '36.

385,650. Snelling Bros., Allentown, Pa.; Nov. 17, '36; ink; use since Jan. 11, '35.

385,682. Braun Bros. Oil Co., Winnetka, Ill.; Nov. 18, '36; gasoline, oils, etc.; use since July 1, '34.

385,813. Sterling Products Co., Easton, Pa.; Nov. 20, '36; laundry sour; use since Nov. 5, '36.

385,815. West Coast Kalsomine Co., West Berkeley, Calif.; Nov. 20, '36; casein paint paste and casein paint powder; use since Oct. 15, '36.

386,378. Samson Plaster Board Co., Buffalo, N. Y.; Dec. 5, '36; paint in paste form; use since Apr. 1, '36.

386,119. Don Lewellyn, Los Angeles; Nov. 30, '36; welding rod; use since Dec. 1, '35.

385,969. Caroline Pyrophyllite Co., N. Y. City; Nov. 25, '36; pyrophyllite; use since Oct. 23, '36.

385,855. H. Muehlstein & Co., N. Y. City; Nov. 21, '36; crude rubber; use since July 27, '34.

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many years the apple grower's main standby, but now generally considered far short of the ideal insecticide.

Main obstacle to the widespread use of phenothiazine in northwestern orchards is its effect on the skin of those who handle it. Many orchard men, particularly sprayers, using it are afflicted with what looks—and feels—like a severe sunburn.

Another possible substitute for lead arsenate suggested by the chemists is nicotine in a form that will stick on fruit and foliage long enough to accomplish its purpose. Because of the quick vaporization of nicotine in combination with soap, Bordeaux mixture, or lime sulfur—perfectly satisfactory against aphids and other soft-bodied insects that die shortly after they come in contact with such a poison—these combinations are worthless against the codling moth which must be made to swallow its dose of cold poison. To get a nicotine compound that will remain poisonous for some time, chemists have tried to fix, or lock up, the nicotine by combining it with various substances.

Bentonite—a natural clay of volcanic origin, found in Wyoming, California, and other nearby States—can be made to unite with nicotine by mixing it with a salt of nicotine, such as the sulfate, dissolved in water. Combinations of nicotine with peat also are being tested.

Still under investigation by the department are pyrethrum, and the rotenone-bearing plants that came into general use several years ago after chemists had proposed them and entomologists had confirmed their value. The chemists are now trying—so far without success—to work out a way to synthesize the insecticidal principles of pyrethrum. The recent discovery that the formulas for these principles heretofore accepted are incorrect has given a new turn to the research, which now may produce the results desired. Better ways for recovering all of the rotenone from derris and cube—the foreign-grown plants that contain this insecticidal substance—were devised last year.

The possibilities for new insecticides among inorganic materials are not being overlooked. Cryolite—"sodium fluoaluminate" to the chemist—has been shown to give adequate control of the codling moth in the relatively dry Pacific Northwest, although it holds out less promise farther east. Unfortunately, fluorine, a component of cryolite, is poisonous to man as well as to insects and its removal from fruits has thus far proved difficult.

CHEMICAL

NEWS & MARKETS

C. Leith Speiden, who has resigned from Innis, Speiden to devote his time to the advancement of the chemurgic movement.

CHEMICALS SHOW PRICE STABILITY

Sharp Advances Registered in '36 in the Oils and Fats, Raw Fertilizer Materials, and Several Important Metallic Salts—Glycerine Market "Sensational"—Congress Flooded with New Bills—

Commodity markets in the past year have been generally characterized by swiftly advancing prices. The various accepted indices of wholesale commodity prices indicate how widespread the gains have been in the past 12 months; that of the National Fertilizer Association has climbed from 78.0 to 85.0, a net gain of 9%; that of the Dept. of Labor from 80.2 to 85.3, an increase of 6%. The comparative stability of chemical and drug prices in the same period, however, is demonstrated by a decline of one-half of 1% in the National Fertilizer Association index. The chemical and drug index of the Dept. of Labor is useless for comparison, for it contains the oils and fats which have had meteoric rises in the past year. According to the National Fertilizer Association figures, the fats and oils have advanced about 20% and the metals approximately 15%.

A compilation of the chemicals and related products (shown below) which have furnished most of the market news in the past 12 months plainly indicates that most of the increases recorded have been in the oils and fats, in the salts of the principal metals, and in raw fertilizer materials. Nearly all of the declines have been in products which are strictly chemicals in the narrowest sense. According to N.F.A. statistics, raw fertilizer materials have advanced about 11%. Of course it is true that the raw fertilizer materials as well as the oils, fats, and metals declined very sharply in the depression and would, therefore, be more likely to rebound much higher in a period of price appreciation.

Various price indices of several trade papers substantiate the statement that chemical prices have held remarkably stable; that of *Chemical & Metallurgical Engineering* shows only a fraction of one per cent. increase in chemicals, but a rise of 18% in oils and fats, while a recent survey by the *Oil, Paint & Drug Reporter* shows the following price changes:—heavy chemicals, 0.2% higher; coal-tar chemicals, 1.0% lower; dyestuffs, textile and leather chemicals, 0.2% higher; paint, varnish, lacquer chemicals, 2.1% higher; oils, fats, waxes, 4.7% higher; fertilizer materials, 10.2% higher; and petroleum solvents, lubricants, fuels, 8.1% higher.

Several of the products which furnished the market "fireworks" in 1936 continue to hold the center of attention. Included in these are ammonium sulfate, cyanamid, copper sulfate, Myrobalans, coconut oil, glycerine, platinum, the organic ammoniates, and naval stores.

European War Preparations

European rearmament, speculation, and hoarding, as well as the generally better state of industrial activity are the principal reasons advanced for most of the price increases. There is little on the horizon at the moment to indicate that any of these forces have expended themselves as yet. Several of the European powers are finding themselves woefully short of copper and other essential metals. Countries which but a year ago were selling oils and fats in an attractively priced U. S. market are now desperately attempting to rebuild stocks in the face of an international shortage. Platinum has proven a desirable hoarding medium in place of the banned gold. Increased consumption, particularly in the ester gum field, the upset conditions in soap manufacture caused by the processing and import taxes enacted in the last two years, recent flood conditions, plus the hoarding of stocks in Europe have created a sensational situation in glycerine. The glycerine market at the moment is strictly nominal and consumers, caught short, are outbidding one another frantically.

Outstanding Price Changes In 1936

	Price on Jan. 1, '36	High—Low 1936	Price on Jan. 1, '37	% Increase or decrease in the year Jan. '36-Jan. '37	Price on Jan. 29, '37
Acetone, tanks	$0.11	$0.11—$0.06	$0.06	— 46%	$0.06
Acid Citric	.28	.28—.25	.25	— 11	.25
Acid Cresylic	.51	.72—.51	.72	+ 42	.72
Ammonium sulfate	22.00	26.00—22.00	26.00	+ 18	27.00
Blood, dried	3.00	4.25—2.50	4.25	+ 41	4.30
Butyl Alcohol	.11	.11—.08½	.09	— 18	.00
Chrome Green	.17	.20—.17	.20	+ 18	.20
Chrome Yellow	.11	.13—.11	.13	+ 18	.13
Copper Sulfate	2.85	4.55—3.85	4.55	+ 18	4.85
Glycerine	.14	.21½—.14	.21½	+ 46	.27*
Litharge	.06	.075—.06	.075	+ 25	.075
Mercury	77.00	93.00—73.50	93.00	+ 21	93.00
Myrobalans J1	23.50	26.50—22.00	26.50	+ 12	28.00
Naphthalene	3.00	4.50—2.75	2.85	— 5	2.85
Oil Coconut	.04½	.08½*—.04⅛	.08½*	+ 89	.09½*
Oil Menhaden, ref. alkali	.072	.084—.066	.084	+ 16	.084
Oil Oleo, No. 1	.14⅛	.14—.09	.14⅛	....	.14½
Oil Tung	.123	.18—.127	.137	+ 11	.133
Platinum	34.50	70.00—34.50	45.00	+ 30	68.00
Red Lead	.07	.085—.07	.085	+ 21	.085
Rosin, X grade	5.60	10.80—4.55	10.80	+ 92	12.50
Sodium Prussiate (yellow)	.11½	.11½—.10	.10	— 13	.10
Sodium nitrate	23.50	25.50—23.50	25.50	+ 8	25.50
Tankage	2.85	4.25—2.65	4.25	+ 49	4.40
Tin Tetrachloride	.25	.26¾—.21¼	.26¾	+ 7	.25½
Trisodium phosphate	2.30	2.30—1.95	2.05	— 11	2.05

* Nominal.

Proposed Legislation

With the inauguration over and Congress organized for a lengthy stay on Capitol Hill the legislative branches are already swamped with an avalanche of proposed measures and a large number of these are of direct interest to the chemical and allied fields.

Representative Wright Patman has indicated the possibility of the introduction of a bill to utilize the Federal trademark system as a means of maintaining retail sale prices.

Proposal is that any holder of a registered trademark be permitted, on payment of a $25 fee, to file with the Patent Office a schedule of minimum prices for each trademarked article at which it is to be resold by all subsequent handlers.

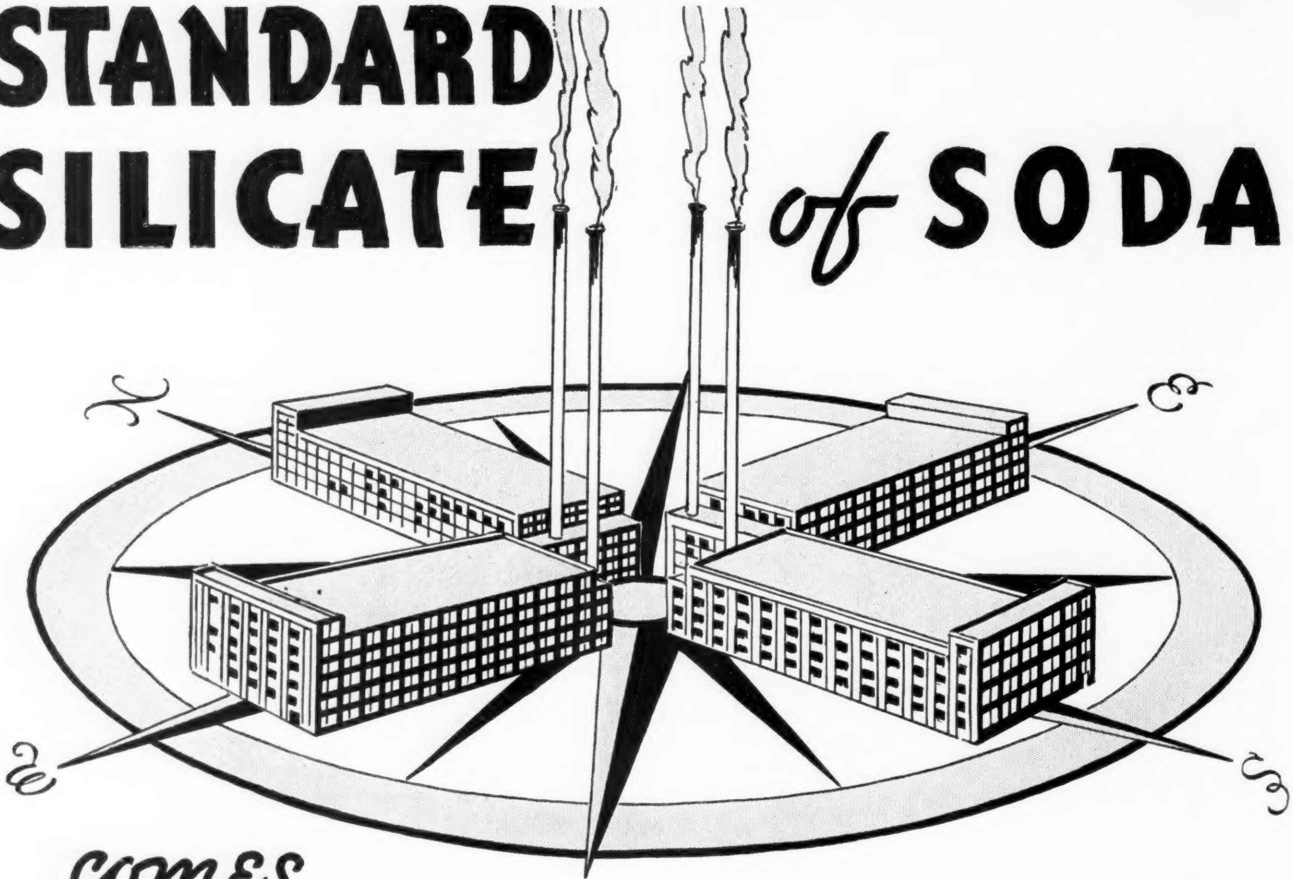
A new and greatly simplified S.5 (food and drug bill) with several important changes in provisions has been introduced by Senator Copeland of N. Y. Representative Virgil Chapman (Ky.) has introduced in the house H. R. 300, a somewhat similar measure.

The old controversy as to whether the Dept. of Agriculture or the Federal Trade Commission should have jurisdiction over advertising, which caused the defeat of the bill last June, is met by providing for the prohibition of false advertising by injunctions from Federal courts. There are no criminal penalties for false advertising and neither the F. T. C. nor the Dept. of Agriculture has any specific jurisdiction over advertising except that either the Food and Drug Administration or U. S. district attorneys may seek injunctions.

President Roosevelt is asking for an extension of authority for a 3-year period to negotiate reciprocal trade agreements.

A number of bills for expanding the powers of the Federal Trade Commission have already been introduced. The most important is H.R. 3143 introduced by Representative Clarence F. Lea (Calif.).

STANDARD SILICATE *of* SODA



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And we mean standardized. We *could* deliver your order in several lots—one from each of our plants—and each lot would prove identical by any test you'd care to make.

Whether your business is paper, fibreboard, corrugated board, soap, asbestos products, metal-cleaning, laundering, electro-plating—any one of the score of industries in which Silicate is used, you'll find a Standard Silicate product in a standardized formula that fits your need today—that will not vary tomorrow.

STANDARD SILICATE DIVISION
Diamond Alkali Company

"STANDARD" *Always a good silicate specification..*

KOPPERS BLDG. PITTSBURGH, PA.

Plants at
JERSEY CITY, N. J. MARSEILLES, ILL.
CINCINNATI, OHIO

The Lea bill follows closely the recommendations made by the commission in its annual reports for several years. Its principal provision would amend section 5 of the trade commission act to give the commission power to prevent unfair or deceptive acts or practices in commerce. At present the commission's authority extends only to unfair methods of competition.

Vegetable Oil Taxes

The controversal subject of vegetable oil taxes is again before Congress. The Dockweiler bill (H.R. 1988) would provide that the present tax of 3c on coconut oil from the Philippines or produced from Philippine copra would not be subject to the present processing tax of 3c if denatured and made unfit for edible purposes.

The Kuntson bill (H.R. 1955) would impose a tax of 6c per lb. on the first domestic processing of coconut, sesame, palm, palmkernel, perilla, rapeseed, hempseed, kapokseed, babassu, imported cottonseed, and sunflower-seed oil, and would also impose an excise tax on the importation of soybean oil. The revenue act of 1934 now imposes a processing tax of 3c per lb. on sesame, palm, palmkernel, sunflower seed, and Philippine coconut oil and 5c per lb. on other coconut oil.

Representative Schuyler Otis Bland has reintroduced as H.R. 126 a proposed amendment to the Revenue Act of 1934 which provides a tax on imports of "fish scrap, fish meal, marine animal scrap, and marine animal meal of " five-eighths of 1c per lb." or $12.50 a ton. This bill is identical with the bill Mr. Bland introduced April 17, 1935, as H.R. 7569. Bill has been referred to the Ways and Means Committee.

Imported Egg Products

New taxes on imported eggs and egg products are provided under the terms of a bill (H. R. 87) introduced in the house by Representative Morgan G. Sanders (Tex.)

For TVA Fertilizer Production

Representative Whelchel (Ga.), has reintroduced as H.R. 2546 a bill authorizing the manufacture of fertilizer by the Government at Muscle Shoals for the benefit of farmers and to be sold to them at actual cost of production. This is the same bill that Mr. Whelchel introduced in February of last year under H.R. 11169. Last year the bill was referred to the Committee on Military Affairs but was not reported out of committee.

Wagner Law Unconstitutional

The Wagner Labor Relations Law was declared unconstitutional in its provision for collective bargaining in a decision handed down Jan. 11th by the U. S. Circuit Court of Appeals for the 9th Circuit, San Francisco. It was a split decision.

Obituaries

Dr. Julius O. Stieglitz, former A.C.S. President, Dies in Chicago —Fred W. Anderson, Founder, Anderson Chemical, Another Victim of Pneumonia — Other Deaths of the Month—

Dr. Julius Oscar Stieglitz, 69, retired administrative head of the Dept. of Chemistry, University of Chicago, died on Jan. 10th of pneumonia.

Dr. Stieglitz was considered one of the greatest teachers of chemistry in this country and wrote many papers on chemical subjects. He was particularly well known for the textbook "Qualitative Chemical Analysis," a standard work on this subject in colleges and universities here and abroad.

He joined the University of Chicago faculty in 1892 as an assistant instructor. He was subsequently instructor, assistant professor, associate professor, and professor beginning in 1905. He had been professor emeritus since 1933, but remained for research work and as a lecturer.

He was Hitchcock lecturer at the University of California in 1909, lecturer at Stanford University in 1912 and at the University of California in 1915. He was Dohme lecturer at Johns Hopkins University in 1924 and lecturer at the Franklin Institute centenary in 1924. He also was Fenton lecturer at the University of Buffalo in 1933.

Professor Stieglitz was a past president of the A.C.S., the Chicago Institute of Medicine, and the Sigma Xi fraternity. He was a past vice--president of the American Association for the Advancement of Science, and was a member of the council on chemistry and pharmacy of the American Medical Association from 1905 to 1926,

Frederick W. Anderson, 85, founder of the Anderson Chemical Co., died on Jan. 9th after a month's illness with pneumonia. He never fully recovered from the injuries received in an automobile accident on Election Day.

Mr. Anderson was born in Nova Scotia and was a descendant of old Royalist stock; his ancestors moved from N. Y. after the Revolution. He founded with the late John F. Myers the Anderson Chemical Co. which was sold to Merrimac several years ago.

Dr. William Pitt Mason, 83, expert in municipal water supply systems, a member of the A.C.S., A.I.Ch.E., and retired professor of chemical engineering at Rensselaer, died on Jan. 26th at his home in Troy, N. Y.

The January issue of C.I. carried the news that William W. Davis, salesman for the Webb branch of U.S.I. was retiring after 50 years of outstanding service. His well-earned retirement lasted but 12 days, for on Jan. 12th he died in his sleep of a heart ailment. He was 75 years old; a commuter on the Lackawanna for 56 years from Madison, N. J. In the blizzard of '88, he used to enjoy recalling, that he was 36 hours late reporting to work. He was treasurer of the Presbyterian Sunday School in Madison for 40 years.

Charles Edward Heald, 88, former president of the Heald tannin extract plant at Lynchburg, Va., died on Jan. 15th of complications which set in following a fall on Christmas Day.

Sarah R. Rosenthal, 64, mother of H. H. Rosenthal, president of the prominent N. Y. City firm of H. H. Rosenthal & Co., died on Dec. 31st. She had been in ill-health for several years.

Lester Wittenberg, 60, executive vice-president of the Barrett Co., died on Jan. 18th after an illness of 5 weeks. He was with the company for 40 years.

Herbert I. Allen, 61, treasurer, Electron Chemical, died on Jan. 11th. He was the developer of the Allen electrolytic cell.

Charles Auerbach, 62, manager for West Disinfecting, died on Jan. 15th in Philadelphia where he lived before moving to N. Y. City.

J. Byrne Severs, Monsanto Chemical, died on Jan. 9th at his home in Cloverport, Ky.

Charles Hayden, 66, senior partner of Hayden, Stone, died on Jan. 8th. He was a director and member of the executive committee of A.A.C.

In the obituary in the January issue of the late Ralph E. Tweed, president and

COMING EVENTS

Technical Association of the Pulp and Paper Industry, Feb. 22-25. Waldorf-Astoria, N. Y. City.

American Society for Testing Materials, Regional Meeting, Palmer House, Chicago, Mar. 1-5, '37.

American Ceramic Society, Annual Meeting, Waldorf-Astoria, N. Y. City, week of Mar. 21, '37.

12th Southern Textile Exposition, Textile Hall, Greenville, S. C., Apr. 5-10, '37.

American Institute of Mining & Metallurgical Engineers, Open Hearth Conference, Birmingham, Ala.

American Chemical Society, 93rd Meeting, Chapel Hill, N. C., April 12-15.

International Association for Testing Materials, 2nd International Congress, London, Apr. 19-24, '37. K. Headlam-Morley, 28 Victoria st., London, S. W. 1.

American Institute of Chemical Engineers, semi-annual meeting, Toronto, Canada, May '37.

American Water Works Association, annual convention, Hotel Statler, Buffalo, N. Y., June 7-11.

American Society for Testing Materials, 40th Annual Meeting, Waldorf-Astoria, N. Y. City, June 28- July 2, '37.

"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

American Chemical Society, 94th Meeting, Rochester, N. Y., Sept. 6-10, '37.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11, '37.

LOCAL TO NEW YORK*

Feb. 19th, Society of Chemical Industry.
Feb. 26th, American Institute of Chemists.
March 5th, Joint Meeting 4 societies.

* Chemist Club unless otherwise noted.

founder of the R. E. Tweed Co., prominent Philadelphia advertising agency it was stated: "that his company had several accounts in the chemical field and that one of these was the Sharples Solvents' account." This gives the impression that the Tweed company is no longer functioning, which is of course entirely erroneous. The company was established in 1920 and is firmly established as a successful agency specializing in technical and semi-technical accounts.

Dr. Alfred L. Oberle, 54, a well-known petroleum technologist, died in Washington on Jan. 17th.

Thomas Massey, member of the fertilizer firm of Massey & Wilmer, Chestertown, Md., died on Jan. 4th.

Other deaths of the month:—Frank Woolsey, 88, for many years president of the C. A. Woolsey Paint & Color Co., Jersey City, on Jan. 11th; Robert Read, 68, chief chemist, Van Ameringen-Haebler, at his home in Elizabeth, N. J., on Jan. 12th; Walter Bonsor, 56, chief chemist, Carbo-Nitro Chemical, South Bend, Ind., of a heart attack on Jan. 11th; Henry C. Smart, 70, a retired plant executive of Standard of N. Y., at his home in New Rochelle, N. Y., on Jan. 14th.

Freeport Sulphur Acquires New Texas Reserves

Cyanamid Purchases Chas. H. Stone, Inc.—General Dyestuff Holds Open House—Du Pont Increases Number of Fellowships—Atlas Buys Revolite—Other Company News—

Signing of a lease on a property known as the Hockley dome, in Harris County, Texas, was announced Jan. 14th by Langbourne M. Williams, Jr., president of Freeport Sulphur. Property was leased from the Stanolind Oil and Gas of Tulsa, Okla., according to Mr. Williams.

Although terms of the lease were not disclosed, the Freeport company president explained "the company is always desirous of obtaining new reserves where production may be undertaken at lower cost." He said the schedule calls for the start of drilling operations in less than 60 days.

Mr. Williams revealed that the lease just signed covers the entire dome area of apporoximately 1800 acres. This dome was discovered in 1906 when the property was drilled in search of oil, he said, adding that the presence of unusually thick caprock overlying the salt indicated sulfur possibilities.

Cyanamid Southern Expansion

American Cyanamid & Chemical has acquired the business and plant of Chas. H. Stone, Inc., Charlotte, N. C. The increase in warehouse and production facilities in the South, on the one hand, combined with a more comprehensive range of chemicals and allied materials together with extensive research facilities, are now placed at the disposal of the customers of both organizations.

The Charlotte District will be under the direction of Paul F. Haddock, southern sales manager, and Chas. H. Stone, Charlotte district production manager.

The Charlotte Office will be transferred to and the business of the Southern District conducted from 822 W. Morehead St., Charlotte, N. C. It is requested that all orders, inquiries and correspondence be directed to P. O. Box 1067. Telephone numbers, Charlotte 6129 and 3-4115; Long Distance 942 and 981

The Greensboro, N. C., warehouse will be continued at 125 Walker av., and the Greenville, S. C., warehouse at 409 Westfield st.

General Dyestuff Entertains

E. K. Halbach, president, and Dr. W. H. Cotton, technical director, were hosts on Feb. 3rd to about 30 representatives of various trade publications in the chemical and process fields on a tour of inspection of the new laboratory and executive building on Hudson st., N. Y. City, followed by a delightful luncheon at the Lafayette.

Preceding the inspection tour, Dr. Cotton gave a short interesting talk in his office outlining the purposes of the laboratory and describing the various unusual and interesting features of its construction and equipment, much of the equipment being of his own design and with innovations and improvements not found elsewhere.

The laboratory, itself, occupies the entire 9th floor of 25,000 square feet, half of which is given over to dyestuff problems in the textile field and half to dye problems in connection with other products such as paper, leather, plastics, etc. Executive offices are located on the 8th floor, all beautifully equipped, have sound proof ceilings and glass brick partitions which also are used on the laboratory floor to divide the executive's offices from the rest of the laboratory. The color scheme throughout the laboratory floor is a special shade of neutral gray so as to interfere as little as possible in the matching of dyes and the determination of colors. Stainless steel equipment is used throughout the laboratory and electricity instead of steam or gas is used for heating.

For Organic Research

Du Pont has decided to increase the number of fellowships it awards annually to 6 post-doctorate fellowships and 18 post-graduate fellowships for the academic year '37-'38. This action has been taken because of the success of the plan in encouraging and developing organic chemical research. These fellowships, which will be located at 18 leading universities and colleges, are maintained to encourage more promising students in research work in the field of chemistry. Last year, the company awarded 4 post-doctorate fellowships and 12 post-graduate fellowships.

Since the company first began these awards in the academic year 1918-19, there have been granted 350 fellowships and 34 scholarships in 33 universities, and, in addition, a national fellowship was awarded at Johns Hopkins for a period of 4 years.

Purpose of the du Pont Fellowship Plan is primarily to promote the advancement of science and the scientific training of young men, and to cooperate with the educational institutions in their efforts to carry on advanced research work. The du Pont fellowships differ from the usual industrial fellowships in that they are not restricted to research on subjects directly connected with du Pont products.

To Move "Revolite" Production

Atlas Powder has acquired "Revolite," formerly manufactured by the Revolite Corp., a subsidiary of Johnson & Johnson, New Brunswick, N. J. Manufacture will be moved to Stamford, Conn., where the business will be conducted by the Zapon Division, Atlas Powder. M. J. Creighton, general manager of the Zapon Division, will direct the new enterprise.

Freeport Continues Pension Plan

Benefits will accrue to employees of Freeport Sulphur not only under the Federal Social Security Act, but also from continuance of the company's established pension plan. While the Federal plan calls for the employer and employee to contribute equal amounts, President Williams states approximately 60% of the cost of the plan which is being continued by Freeport Sulphur is contributed by the employer.

Heard and Overheard

The Cook Swan Co. and the Wyandotte Oil & Fat Co., wholly owned subsidiaries of the Werner G. Smith Co., Cleveland, were dissolved as of Dec. 30th, and the business of both companies is now carried on directly in the name of and by the Werner G. Smith Co.

Beck, Koller, Detroit, has announced the opening of a Cincinnati office and warehouse located in the Cincinnati Terminal Warehouses.

Office will be under management of W. J. Deeks, formerly connected with the concern's Cleveland office. R. J. Coerdt, who has been on the company's Cleveland sales staff, has been placed in charge of that office.

An engaging series of monthly meetings are being held by the staff of National Oil Products. This year's plans include a number of prominent speakers who have been scheduled to talk on a number of intensely interesting subjects. The December speaker was Howard S. Nieman, patent attorney and editor; the January meeting was addressed by Dr. Gerald L. Wendt, editor of *Chemical Reviews*.

Suit to compel West End Chemical, pioneer manufacturers of borax on the Pacific Coast, to pay a million dollars in accumulated capital stock dividends was filed at Oakland, Calif., on Jan. 16th.

Mrs. Evelyn Smith, widow of the late "Borax" Smith, founder of the company, was named co-defendant in the suit, filed by John Gallois, a San Francisco stockholder.

Foster D. Snell, Inc. held its annual dinner on Jan. 12th, with 24 members of the organization present and 4 absent. Ray Hedman acted as toastmaster and introduced as speakers Leon V. Quigley, Dr. Foster Dee Snell and Cyril S. Kimball.

Solvay Process has purchased 40 acres near the N. Y. State Fair grounds but no indication is given as to what purpose the property will be used for.

Lex Chemical has been formed by Edward J. Dooskin at 130 Tremont st., Everett, Mass. Paints and enamels will be made.

Dixon Industries, Andalusia, Ala., is a new naval stores producer.

Eastern Fertilizer, Baltimore, has purchased the Meadows Fertilizer plant at New Bern, N. C. for approximately $14,000, according to newspaper reports.

Columbian Carbon has purchased the plant of Keystone Carbon, near Monroe, La., and also the plant which was used by Miner-Edgar at Monmouth Junction, N. J.

Julian M. Avery is representing Arthur D. Little, Inc., Cambridge, Mass., in the N. Y. area with offices in the Graybar Bldg.

The Bristol Lacquer & Chemical Co. has been formed at Bristol, Conn.

The shipping strike is seriously crippling 8 vegetable oil refineries located in the San Francisco bay district.

H. W. Gould & Co., San Francisco, will develop a quicksilver mine near Minto, British Columbia.

Argol Chemical Co., 121 S. Gay st., Baltimore, Md., is a new manufacturer of soap powder.

Kelloggs & Miller, Inc., linseed oil manufacturer, which for nearly 113 years has borne that name, and for more than 100 years was owned by the direct descendants of the families which founded it, has ceased to exist under that name, and on Jan. 4th the plant began operations under the name of the Bisbees Linseed Co. The latter took over Kelloggs & Miller in '28 but did not change the company name until now.

Purchases Dust Equipment

Phelps Dodge Corp., N. Y. City, has placed an order for shipment to Nichols Copper, Laurel Hill, N. Y., for Norblo cooling and dust collecting equipment, to be installed at the tin furnaces. Bunker Hill Smelter, Kellogg, Idaho, placed an order for shipment to Northwest Lead, Seattle, Wash., for Norblo cooling and dust collecting equipment.

Soap Prices Go Higher

P. & G. has announced another advance of approximately 5% in soap prices. At the same time, earnings for the December quarter for the company and its subsidiaries were reported to be at a new high record.

Price increase follows an advance of about 4% in Ivory and Camay brands on Dec. 12th, similar advances last September, and an advance of about 4% on laundry soaps made in November. It is expected that this latest price increase will be followed generally by the trade.

Hyatt—Father of Plastics

The inspiring story of John W. Hyatt, the young typesetter who became, through persistent experimentation and research, the father of plastics, was the subject of a recent nationwide broadcast of Du Pont's "Cavalcade of America" program, one of radio's foremost dramatic presentations.

He was born in Starkey, N. Y., the son of a blacksmith-mechanic. Although his schooling was limited to a country school and a single year at a small-town seminary, he inherited from his father a persistent mechanical curiosity. His brilliant scientific career was launched in 1863, when he heard that a $10,000 prize would be given for a satisfactory substitute for ivory in making billiard balls. At that time he was a 26-year-old typesetter in Albany, N. Y., and had supported himself for 10 years in the printing business.

Devoting all his spare time to research on the problem of an ivory substitute, the young printer was ridiculed on all sides for attempting what skilled chemists had been unable to solve. Undaunted, he found another place and kept on trying. A bottle of collodion upset in the printshop furnished him a valuable clue and finally, in 1870, having proved that nitro-cellulose and camphor could be molded into a smooth, hard material, providing heat and pressure were present during the process, he was granted a patent for an "improvement in treating and molding pyroxyline," marking his success where experienced scientists had failed. This was the first successful plastic material

Third Dearborn Conference to be Held May 25-27th

Six Regional Chemurgic Conferences Also Scheduled—Chlorine Institute Elects Officers—Faulharber Heads Compressed Gas Association—Wafer is Reception Committee Chairman, Drug-Chemical Dinner—

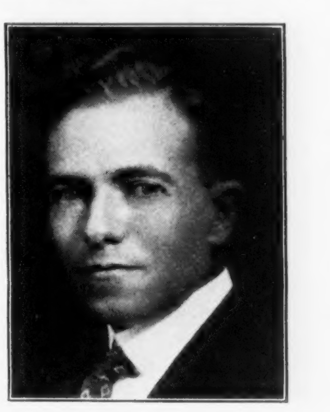
The Third Dearborn Conference will be held at Detroit and Dearborn, May 25, 26 and 27th. This third annual meeting of the representatives of agriculture, industry and science, dedicated to the purpose of advancing the use of American farm products through applied science, will again be held under the joint sponsorship of the Chemical Foundation and the Farm Chemurgic Council.

Prior to the Third Dearborn Conference, 6 Regional Conferences will be held in Southern and Western cities. They are scheduled as follows: Los Angeles, Feb. 17th; Gainesville, Fla., Feb. 20th; Omaha, Neb., March 9 and 10th; Spokane, Wash., March 22 and 23rd; Macon, Ga., April 9 and 10th; and Jackson, Miss., April 12 and 13th.

Chlorine Makers Convene

The Chlorine Institute at a meeting on Jan. 21st elected the following officers; S. W. Jacobs, president; Eben C. Speiden, vice-president; and Robert T. Baldwin, secretary and treasurer.

The following directors were elected for 2 years: N. E. Bartlett, Penn. Salt; Thomas Coyle, R. & H. Chem. Dept., du Pont; John A. Kienle, Mathieson Alkali; Louis Neuberg, Westvaco Chlorine; and Eli Winkler, Columbia Alkali.



S. W. JACOBS
Reelected president of the Chlorine Institute.

The hold-over directors are: J. F. C. Hagens, Great Western Electro-Chemical; H. M. Hooker, Hooker Electrochemical; S. W. Jacobs, Niagara Alkali; and Eben C. Speiden, Innis, Speiden & Co., Isco Chemical Division.

The annual meeting was addressed by William W. Hurlbut, engineer of Water Works, Dept. of Water and Power, Los Angeles, and president, American Water Works Association, Elon H. Hooker, president of Hooker Electrochemical, E. M. Allen, president, Mathieson Alkali, and S. W. Jacobs, vice-president, Niagara Alkali.

Compressed Gas Makers Elect

E. A. Faulharber, Compressed Industrial Gases, Inc., Chicago, was elected president of the Compressed Gas Manufacturers' Association at the 24th annual meeting held at the Waldorf-Astoria on Jan. 18th. Following were elected vice-presidents for '37: W. N. Cocharn, Crystal Carbonic Laboratories, Atlanta, Ga., and J. J. Crowe, Air Reduction Co., N. Y. City. F. R. Fetherston was re-elected secretary and treasurer, a post he has held for many years.

Salesmen's Slate Selected

The nominating committee of the Salesmen's Association has suggested to the membership the following slate:—President, Charles Lichtenberg, Commercial Solvents; vice-president, Charles E. Kelly, Hagerty Bros & Co.; secretary, DeWitt Thompson, Mathieson Alkali; treasurer, J. M. Wafer, Industrial Chemical Sales. A. A. Wasserscheid, Mallinckrodt, and W. D. Merrill, Turner, have been proposed to serve on the executive committee for one year.

Dinner Reservations Above 700

"Joe" Wafer, Industrial Chemical Sales, is chairman of the reception committee for the Drug-Chemical Dinner, scheduled for March 4th at the Waldorf in N. Y. City. "Charlie" Kelly, Hagerty Brothers, is serving as vice-chairman. They are being assisted by a committee of 74 members.

Reservations for the dinner are now well above 700. Reservations can be made through the secretary, Ray Schlotterer, N. Y. Board of Trade, 41 Park Row, N. Y. City. Cost per person is $8.

Morgan Heads N. Y. Section

Dr. D. P. Morgan has been elected chairman for '37 of the N. Y. Section of the A.C.S., largest of the Society's 80 local units. Dr. Morgan, chemical economist of Scudder, Stevens & Clark, investment counsel, succeeds Dr. Lawrence W. Bass, who recently resigned as director of research of The Borden Co. to join the staff of Mellon. Dr. Duncan A. MacInnes of the Rockefeller Institute was chosen vice-chairman; Dr. Cornelia T. Snell, secretary; and D. R. deLong of the Amusol Corp., treasurer.

Leary Heads Wax Importers

At its annual meeting at the N. Y. Athletic Club in N. Y. City the N. Y. Wax Importers Association re-elected the following officers: W. F. Leary of William M. Allison & Co., president; E. Strahl of Strahl & Pitsch, vice president; R. E. Sievert, Frank B. Ross, treasurer, and Charles Christman of Smith & Nichols, secretary.

Co-operative Turpentine Drive

The American Turpentine Farmers Association has started with what is said to be the greatest co-operative move ever originated in the naval stores industry.

Association inaugurated a national advertising campaign Jan. 1st to exploit the further use of turpentine. Campaign, for which no agency has yet been selected, will be conducted during 1937 at a minimum cost of $200,000. Producers are assessed 65c per cask and the factors 5c per cask to finance the campaign. C. P. Kelly, Madison, Fla., is secretary of the association.

Textile Sizing Discussed

Permanent sizing of textiles with alkali-soluble cellulose ethers will be discussed by Dr. Wallace P. Cohoe, vice-president of the Sylvanic Company, in an address to the American Section of the Society of Chemical Industry, Feb. 19th. The meeting will be held in the Chemists' Club (N. Y. City), with James G. Vail, Philadelphia Quartz, presiding.

Kimball Succeeds Snell

Dr. Foster D. Snell has resigned as secretary of the American Section of the Society of Chemical Industry. He is succeeded by Cyril S. Kimball.

C. Leith Speiden To Enter Chemurgic Movement

McClintic and Brown Appointed Assistants to Koppers' President—Witco Carbon Engages Johnson and Minnig—Fritz in Charge of Koroseal Sales—Hostetter in New Connection—Other Personnel Changes—

C. Leith Speiden, who has been associated with Innis, Speiden since his graduation from Cornell in '15, has resigned his active connection with that company.

Temporarily his address will be Walnut Hills, Orange, Va., which was once the home of General James A. Kemper, former governor of that State.

Mr. Speiden has for some time been keenly interested in the general Chemurgic movement for the advancement, through applied science, of the use of American farm products in industry. He will divide his time between this work and the breeding of fine cattle. Mr. Speiden is an ardent horseman.

Tierney Selects Assistants

Appointment of Stanley N. Brown and Robert H. McClintic as assistants to the president of Koppers, was announced last month by J. T. Tierney, president. Mr. Brown will be concerned with company financial and executive matters, while Mr. McClintic will be in charge of all advertising and sales promotion for Koppers, its divisions and subsidiaries, except the advertising of the company's coke plants.

Mr. Brown formerly was associated with Koppers Coal Company, and Mr. McClintic was advertising and sales promotion manager of Koppers Products.

Witco Carbon Personnel

Witco Carbon, new carbon black producer, has appointed C. R. Johnson as technical director. He has been with Goodyear, Godfrey L. Cabot, and Philadelphia Rubber. Carl J. Minnig has been appointed general sales manager. Since 1921 he has been in charge of natural gas products and carbon black production for Phillips Petroleum.

Fritz, Hoover Promoted

Dr. Howard E. Fritz, formerly chemical sales manager of B. F. Goodrich, mechanical division, has been named manager of Koroseal sales and development. Dr. Fritz, well known in chemical circles, came to Goodrich in '25 from the faculty of Ohio State where he received his master's degree in chemistry in 1913 returning to the university after 8 years in industry to receive his doctor's degree in '21.

He is succeeded by J. R. Hoover, with Goodrich since 1925 in the laboratories and development departments. He was appointed manager of chemical laboratories in 1930 and became associated with Dr. Fritz in chemical sales in '31.

Resigns from Corning Glass

Dr. John C. Hostetter, who left Corning, N. Y., on Jan. 13th for Hartford, Conn., to assume his duties as vice-president of the Hartford-Empire Co., was honored at a farewell party by Corning Glass Works employees on Jan. 11th at the Baron Steuben Hotel.

W. C. Taylor served as master of ceremonies and introduced Amory Houghton, president of Corning, and Dr. E. C. Sullivan, vice-president.

Frolich Heads Laboratories

Several new executive appointments have just been announced by the Standard Oil Development. Dr. Per. K. Frolich, chief chemist, now heads up the newly formed Chemical Laboratories. P. J. Byrne, Jr., is being transferred from the Aruba Refinery to serve as assistant chief process engineer of the Process Engineering Division. P. E. Kuhl has been appointed assistant manager of the

CHEMICAL

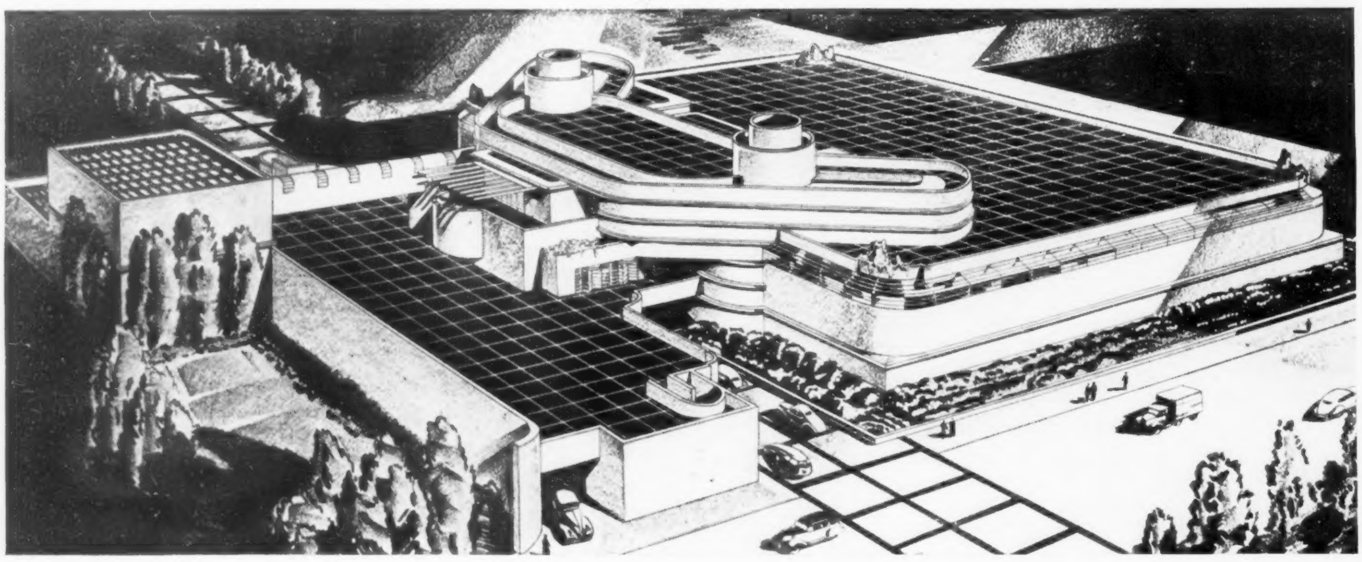
The Photographic Record

New Caledonians gaze in awe at chrome in a form they are unaccustomed to seeing it in. They find it difficult to believe that the shiny metal finish was produced from the ore they helped dig at Mutual Chemical's New Caledonian mine.

New plant of Kaolin, Inc., at Spruce Pine, N. C., the design of which is the result of an intensive six-year study of the known American primary, or residual, deposits and existing American processing methods. Best American methods have been combined with the processing universally recognized as world's standard, that of Zettlitzer Kaolinwerke, Czechoslovakia, for which the firm has exclusive American license.

Bakelite Corporation's display at the Annual Science Exhibition held recently in Atlantic City, depicted improvements the chemist has contributed in recent years to various industrial materials, not only exemplifying the new materials but also demonstrating their superior characteristics as compared with materials hitherto available.

Frank Lloyd Wright, famous for his architectural creations, has just completed his designs for a new office building at Racine, Wis., which will be ready for occupancy in the summer. It is designed to house the main office of S. C. Johnson & Son, Inc., makers of Johnson's wax polishes, and other chemical specialties.



NEWS REEL

of Our Chemical Activities

The unique Christmas card mailed by William B. Leach, Mathieson's Niagara plant, shows Mr. and Mrs. Leach and the "family." Mr. Leach is standing between "Eleanor" and "Franklin" and Mrs. Leach holds "Peggie" and "Neuke" on the leash.

A million dollar industry will be opened in Cedartown, Ga., with the establishment of a southern plant by National Oil Products, Harrison, N. J. Discussing plans are (seated left to right), Preston S. Arkwright, president, Georgia Power Co., and J. H. Barton, vice president, National Oil Products. Standing (left to right), William H. Barnwell, industrial agent, Georgia Power, and E. T. Woods, chief engineer and works manager of the new plant.

Mister and Missus in the chemical business. Mr. and Mrs. Paul D. Frame, Ulrich Chemical Company, Indianapolis.

A recent meeting of the Kanawha Valley section, A.C.S., was addressed by Dr. Norman Krase, U. of P., following which officers for the new year were elected and installed. Standing, left to right, E. T. Crawford; Dr. Krase; T. W. Bartram, executive committee; H. L. Cox, vice chairman, and J. R. Williams, executive committee. Seated, left to right, are W. E. Sohl, retiring secretary; H. C. Holden, retiring chairman; W. E. Vail, new chairman; G. V. Scofield, treasurer, and C. L. Blair, new secretary.

Process Department and Dr. F. L. Miller, formerly in charge of lubricants research at the Esso Laboratories, now becomes assistant director of that organization. The offices of all four will be located at Bayway.

Nickel Makes New Appointments

International Nickel has added several to the research staff in the past month or so, including Dr. Charles H. Lindsley, physical chemist, who will specialize in the application of physico-chemical methods to the study of corrosion; Donald J. Reese, formerly with the Whiting Corp.; Frederick G. Sefing, formerly at Michigan State College; and Richard F. Barnes, Jr., who will be available to industry for technical service on problems involved in the utilization of mill products such as Monel, nickel, and Inconel for applications requiring resistance to corrosion. Also Carl Rolle who will be available for consultation on mill product fabrication problems.

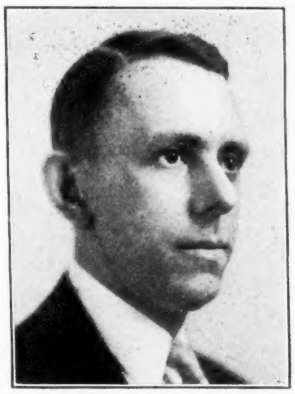
Davison Subsidiaries' Personnel

James P. Rossman, vice-president of Davison Chemical Corporation, Baltimore, and president of Berkshire Chemical Bridgeport, Conn., a Davison affiliate, has resigned, and J. V. Champion, president of the Eastern Cotton Oil, Norfolk, another Davison subsidiary, has also severed his connection with the company.

Berkshire Chemical's operations will be managed by George Worman, who has been associated with the company in Bridgeport for many years. A. D. Kincaid, has been appointed division manager of Eastern Cotton Oil.

Dahm Elected Robins President

Directors of G. S. Robins & Co., St. Louis, have elected Henry L. Dahm as



HENRY L. DAHM

New head of G. S. Robins & Co.

president. Other officers are Eugene S. Weil, vice-president; G. Kenneth Robins, secretary; and Mrs. Bessie A. Robins, widow of George S. Robins, treasurer.

Other Personnel News of the Month

Frederick S. Bacon, for 7 years chemical engineer for the Boston Blacking and Chemical Co., Cambridge, Mass., has resigned to join the staff of Gustavus J. Esselen, Inc., chemical consultants, Boston, Mass.

D. M. Schindler, manager of the Central division of National Lead, with headquarters at San Francisco, has been made general sales manager for the concern's Pacific coast branches, and is succeeded in his former position by Horace L. Pickett. Mr. Schindler was formerly manager for the company at Seattle and previous to that was assistant sales manager at San Francisco. Mr. Pickett has been in sales promotion.

Washington Dodge, for a number of years connected with the Agricultural Development Bureau of Barrett, has resigned and is now associated with Biggs, Mohrman & Co., members of the N. Y. Stock Exchange.

Jerome S. Rogers, a tanning chemist of wide experience in the leather and shoe industries, has joined the staff of the Bureau of Chemistry and Soils, U. S. Department of Agriculture. Mr. Rogers has served on the Council and on a number of committees of the American Leather Chemists Association, and is a past president of that organization.

Ashcraft-Wilkinson, Atlanta, at the December meeting of the board of directors, made Trenton R. Tunnel and Emory L. Cocke vice-presidents.

Charles M. Rice, formerly with Stanley Chemical and also the Arco Co., has joined Bakelite's sales staff on resins for the paint and allied trades.

D. C. McRoberts, editor of *India Rubber World*, has resigned to become associated with the Kaysam Corp. of America as assistant to the president, Allan A. Ryan, Sr. In this new connection Mr. McRoberts will be engaged in extending the application of latex to the manufacture of all types of rubber products by the Kaysam casting process.

Harold P. Greenwald succeeds William P. Yant as supervising engineer of the Pittsburgh Experiment Station, Bureau of Mines.

J. Coard Taylor has been elected vice-president of Ethyl Gasoline. He has been general sales manager since '29, when he succeeded Archibald M. Maxwell, who resigned to become vice-president of Standard of Ohio.

He is 36 years old and a native of Cranford, N. J. He joined the Ethyl organization in '26 as its Canadian representative with headquarters at Toronto.

Walter J. Fried, well known in industrial alcohol circles, has been appointed to succeed Paul Harrison as manager of Alcohol Sales of the N. Y. Division.

Fred Henley of the Chicago office has been appointed to succeed John W. Dunn as Detroit division manager.

A. G. Fairweather, formerly sales manager for N. J. Paint Works—Harry Louderbough, Inc., Jersey City, N. J., has joined the Red Hand Compositions Co., Inc., N. Y. City, in charge of paint specialty sales.

H. G. Weicker, vice-president, Dolge & Olcott, has resigned. At various times he has been with Squibb, Merck, and Calco. He has not announced future plans.

James T. Gow has joined Battelle Memorial Institute as a research metallurgist. He was formerly with International Nickel.

Charles J. Conroy, formerly chemist with Carpenter Steel and a graduate of Gettysburg College, is now with Foote Mineral, Philadelphia.

Robert W. Boise, well-known in the dry color field, is now with Harmon Color, Brooklyn, as general sales manager.

In the Equipment Field

Erwin A. Wendell is now district sales manager for Link-Belt, with headquarters at 317 N. 11th st., St. Louis, Mo. He succeeds Howard L. Purdon who is now in sales work in the Chicago territory.

Russell T. Kernoll has been appointed chief engineer of welded fabrication for Edge Moor Iron Works. He was formerly with M. W. Kellogg Co., and previous to that with Struthers-Wells.

According to announcements just made by Aurora Pump, Aurora, Ill., two important additions have been made to the executive personnel. They are Frank S. Main and Lionel W. Claypool, both of whom have resigned their positions with Micro-Westco to become president and vice-president respectively of Aurora Pump.

Cutler-Hammer, Inc., manufacturers of electric control apparatus, Milwaukee, announces appointment of T. D. Montgomery as manager of its foreign sales.

Leslie L. Andrus, assistant sales manager of American Foundry Equipment, Mishawaka, Ind., for the past 2 years, has been appointed general sales manager.

Foreign Trade

Japs Plan Purchase of 50,000 Tons of Sulfate—Italy Becomes a Buyer of Citric—U. K. Removes Oxalic from Free List—

The Japanese Dept. of Agriculture and Forestry plans acquisition of 50,000 metric tons of ammonium sulfate which will be stored for emergency purposes. In order not to disturb the domestic market these emergency stores will be built up with imported materials, press reports indicate.

Because of the domestic shortage of citric acid in Italy a total of between 900 and 1,000 tons have been imported from Belgium to meet the local demand.

Great Britain has removed oxalic acid from the free list.

McCoy is the '37 Willard Gibbs Medalist

Metz Estate Has Net Value of $493,342—Fischer, Dorr Co. Receives the Allen Memorial Award—Lammot du Pont Elected a Regional Vice-President, National Association of Manufacturers—Other Personal News—

Dr. Herbert Newby McCoy, internationally known for his achievements in radioactivity and in many other fields of chemical science, has been awarded the '37 Willard Gibbs Medal of the Chicago Section of the A.C.S., one of the highest scientific honors bestowed in the U. S.

Dr. McCoy, for 16 years a member of the Faculty of the University of Chicago, and now vice-president and director of research of Lindsay Light and Chemical, Chicago, was cited as "pioneer in a greater number of fundamental discoveries than any but 3 or 4 living American chemists."

Details of Estate Disclosed

Herman A. Metz, for several decades one of the most prominent chemical manufacturers and importers in this country, and who died on May 17, '34, left an estate with a net value of $493,342. Gross estate was reported at $927,247 but $379,429 in debts were listed. His widow was the chief beneficiary.

Securities, which formed the largest part of the estate, amounted to $559,429, and included among the largest holdings 2,000 shares of Consolidated Color & Chemical, common, $150,000; 805 shares of N. Y. & Hanseatic Corp. common, $64,400; 369 shares Advance Solvents & Chemical common, $63,000; 1,560 shares American I. G. Chemical common, $50,700; American Chemical bonds, $51,547.

For Research on Sewage

Dr. A. J. Fischer, development engineer for the Dorr Co., was the recipient this year of the Kenneth Allen Memorial Award given by the N. Y. State Sewage Works Association, for the best paper of a research nature to be presented before the Association in 1936.

Names in the News

In the recent election of officers of the National Association of Manufacturers S. Bayard Colgate, president, Colgate-Palmolive-Peet, and Lammot du Pont, president of E. I. du Pont de Nemours & Co., were among the regional vice-presidents elected.

Peter Dirr, vice-president, Charles L. Huisking & Co., recently celebrated 25 years of service with the company.

J. H. Mitchell-Roberts, export manager, Oliver United Filters, left the latter part of January for an extended trip throughout the Far East, visiting in the Philippines, Japan, Australia, and other countries.

Ira Vandewater was in Bermuda last month.

Chas. L. Huisking sailed in the *Washington* on Jan. 13th. He will visit London, Norway, and Germany, and expects to return on Feb. 20th.

Williams Haynes, publisher of CHEMICAL INDUSTRIES, was operated on for a streptococcus infection of the ear at the New Haven Hospital on Jan 22nd. He was discharged from the hospital on Feb. 2nd and is convalescing at his home at 421 Humphrey st., New Haven.

William J. Reardon of the Reardon Color & Chemical Works, Cincinnati, Ohio, has just returned from a trip south to enlist the support of Louisiana and Mississippi for the Barkley-Vinson Stream Purification Bill to be introduced into the present Congress. Mr. Reardon is a member of the Cincinnati Stream Pollution Committee formed to prevent the pollution of the source of drinking water for Cincinnati and the Ohio Valley.

William C. Weber of The Dorr Co., who returned from Japan on Dec. 22nd, sailed on Jan. 23rd for Europe. He will spend about a month with Dorr-Oliver N. V. at The Hague in connection with the design of a fertilizer plant for Toyo Koatsu Kogyo K. K., a Mitsui subsidiary. This plant, which will produce ammonium phosphates and sulfate, will be located at Miike, Kyushu, Japan.

Herman P. Johns, eastern sales manager, Grasselli chemicals department of du Pont, is in Florida.

Charles B. Chrystal, head of the Charles B. Chrystal Co., N. Y. City, is on a Mediterranean cruise.

Dr. H. H. Mosher, Onyx Oil & Chemical, and Dr. J. E. Meili, Sandoz Chemical, were the speakers at the last meeting of the N. Y. Section of the A.A. T.C. & C.

Robert ("Bob") I. Wishnick, president of Wishnick-Tumpeer, has been elected a member of the Board of Trustees of Armour "Tech," as representative of the alumni. He graduated in '18.

Labor Strife Curtails Chemical Consumption

Flood and Fear of Adverse Legislation in Washington Additional Factors—Excellent Demand for Disinfectants—Copper Sulfate Advanced Sharply—Acetic Prices are Lower—

The market for industrial chemicals was greatly influenced last month by labor disturbances in the automotive, glass, and textile fields, by the severe flood conditions in Ohio, Kentucky, and Illinois, and by the unsettlement arising from the pending legislative matters in Washington. Yet despite these adverse factors, consumption did not decline as rapidly as many producers anticipated. The strikes at the safety glass plants have been settled, but it will be several weeks before the manufacturers can get back to normalcy. In the meantime, the labor strife in the automotive field gives every promise of being a long drawn out affair, and this situation is rapidly curtailing chemical consumption in certain directions.

To Stop Speculation

Disinfecting chemicals are in good demand in the flood areas and shortages of some items, such as bleaching powder, have became very acute.

Producers of chloride of lime are watching carefully to prevent speculators from purchasing this product under the pretext of acquiring it for use in flood districts.

Price changes last month were largely in the metal salts. The spectacular rise in copper has forced a general upward revision of all the copper chemicals. The lower quotations for acetic were generally expected in the trade.

Important Price Changes

	Jan. 30	Dec. 31
ADVANCED		
Antimony metal	$0.14	$0.13¼
Antimony oxide	.14¼	.13
Antimony needle	.14	.11½
Bordeaux mixture	.10	.09½
Calcium arsenate	.06¾	.06½
Copper acetate	.22¾	.22
Copper carbonate	.16¼	.14½
Copper oxide, black	.17½	.15¼
Red	.17	.14
Copper sulfate	4.85	4.45
Magnesium chloride	39.00	36.00
Sodium antimoniate	.13¾	.12
DECLINED		
Acide acetic, 28%	$2.25	$2.45
Glacial	8.00	8.43
Arsenic, white	.03	.03½
Sodium acetate, flake	.04¼	.04½
Sodium stannate	.33	.34
Tin crystals	.37½	.38½
Tetrachloride	.25½	.26¾

Coal-Tar Chemicals

Suppliers of coal-tar chemicals reported last month a brisk call for most items. Disinfectants were in particularly good demand for shipment to the flood areas. This condition has aggravated still further the shortage of cresylic. The solvents moved out into consuming channels in good volume during most of the month, but some slackening was reported towards the close when it became apparent that the efforts to reach a settlement of the strikes at the plants of General Motors had failed. Producers of intermediates report good volume, and dye sales in the textile and leather fields have held up very well.

Production of coke from byproduct and beehive ovens amounted to 4,608,655 tons in December, the daily average output of 150,283 tons being 4.0% above the November rate.

Important Price Changes

ADVANCED

	Jan. 30	Dec. 31
Anthraquinone	$0.65	$0.50

DECLINED

None.

Fine Chemicals

The widespread flood area of the middle west brought about a much greater demand for a number of pharmaceuticals and disinfectants. Some recession in the grippe-influenza wave was reported, but large quantities of fine chemicals and pharmaceuticals were shipped out to cold remedy manufacturers.

Important Price Changes

ADVANCED

	Jan. 30	Dec. 31
Camphor, slabs	$0.55	$0.52
Powder	.55	.52
Glycerine, C. P.	.25	.23½
Dynamite	.25	.21½
Soap lye	.23	.16
Saponification	.25	.17½
Menthol	3.35	3.10
Synthetic	2.25	2.25

DECLINED

	Jan. 30	Dec. 31
Cream of tartar	$0.15	$0.16¾

The shortage of glycerine has reached the acute stage. The plants of several of the important producers are located in the flooded sections of the mid-west and this has lessened the meager supply available. First-hands have advanced prices sharply but it is very doubtful that material for spot delivery can be obtained from other than second-hands and at a large premium over the published quotations.

Mercury Market Quiet

For the time being comparative quiet prevails in the mercury market and no changes were reported in the quotations for mercurials. Camphor was quoted higher by Japanese factors.

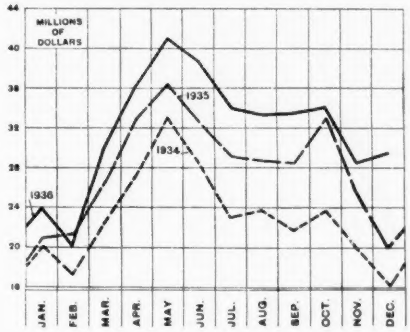
Solvents

Demand for most solvents reflected the unsettled conditions in the automotive field. Producers of finishes have reduced operating schedules as a result of the shutdown of several of the General Motors' plants. With higher crude prices in effect since the first of the year there is talk of possible advances for petroleum solvents, but at the close of January refiners were still quoting at unchanged levels.

Sharp Advances in Natural Varnish Resins

Tripoli is Reduced and China Clay is Advanced—Trading is Dull in Raw Paint Materials—Paint Export Figures Up—Private Building Expands—Auto Strike Curtails Lacquer Production—

Paint raw materials markets in January were featured by sharp upward revisions in several of the important natural varnish resins. Buyers, fearing still higher quotations over the next several months, were reported to be purchasing heavily. Ester gum was advanced when glycerine soared still further, and prices for the better rosins continued to hold steadily at the high levels reached in the past two months. The lower grades, however, and turpentine declined as a result of much larger receipts at the primary centers. Other price changes included lower car lot quotations for the several grades of Tripoli and advances for both wet-ground and dry-ground china clay.



—Bureau of the Census

Trend in paint sales in '36.

Trading in raw paint materials was seasonally slow and this condition of dullness was accentuated when several manufacturers of automotive finishes suspended their usual withdrawals against contracts. Shipments of lead pigments were not large due to the fact that consumers stocked up heavily at the time of the sharp advances in December.

Our foreign trade in paint products, both exports and imports, declined more than seasonally in November, but accumulative totals for the first 11 months of the year are well above those for the same months of '35. The shipping tieup was the principal factor contributing to the unusual decline in November.

Total value of paint product exports aggregated $1,413,000 in November, a decline of $310,000 compared with the record for November, '35. Practically every item on the list shared in the decrease.

The year 1936 provided a construction total in the 37 eastern states of $2,675,296,000, a gain of 45% over the figure of $1,844,544,900 for '35. Increases over '35 were especially pronounced in residential building which showed a gain of 67% in the 1936 figure.

The December '36 total for construction of all descriptions in the 37 states amounted to $199,695,700 and compares with $208,204,200 for November '36 and $264,136,500 for December '35. The loss from December, 1935, was entirely due to a shrinkage in public projects of every description.

Important Price Changes

ADVANCED

	Jan. 30	Dec. 31
None.		

DECLINED

	Jan. 30	Dec. 31
Cellulose acetate, flake	$0.40	$0.55

Flaxseed in the Final Quarter

Bureau of Census reports that, according to preliminary figures, 194,071 tons of flaxseed were crushed and 131,829,085 lbs. of linseed oil produced in the last quarter of '36. These figures compare with 231,942 tons of seed crushed and 156,607,804 lbs. of oil produced in corresponding quarter of '35.

Bright Outlook In Naval Stores

Judge Harley Langdale, president of the American Turpentine Farmers Association, in Washington, on Jan. 21st, stated that prospects for the gum turpentine industry are bright in view of an advertising campaign to be instituted shortly to promote gum turpentine sales. Final arrangements are being made for the campaign.

Judge Langdale declared that his association is well satisfied with the soil conservation program for the naval stores industry for 1937.

Canadian Chemical Production

Canadian chemical production is estimated to have increased from 5 to 25% in '36 compared with '35 on the basis of output recorded in the Province of Ontario. All lines except artificial leather shared in the upward movement, according to American Consul Damon C. Woods, Toronto, made public by the Commerce Dept's Chemical Division. In November, 1936, the industry was employing 7% more workers than in the same month of the preceding year.

Suspends Rosin Bounty

Bounties on exports of domestic rosin from France were suspended in December by the French Naval Stores Commission, due, it is stated, to the excellent export season enjoyed by that branch of the naval stores industry.

John J. Ryan & Sons, 40 Worth st., N. Y. City, is now importing a new artificial wool from Italy. It is called Cisalfa and is a viscose product. Current production in Italy is 150,000 lbs. per week.

Sulfate, Cyanamid Quotations Higher

Fertilizer Tag Sales Up 11% Over '35—Mixers Prepare for Heavy Spring Season—November Superphosphate Production Up 37%—November Exports, Imports Decline—N.F.A. Defends Suggested Trade Practice Rules—

Both sulfate and cyanamid quotations were revised upwards last month. In the trade there were doubts that any increase in nitrate would be announced for the time being at least. Some fear was expressed that the $1 advance in ammonium sulfate would bring about re-selling and a little material was reported offered in the south. Organic ammoniates moved still higher in the first three weeks of the past month but when some weakness appeared in the price structure in the final week buyers entered the market with firm offers. Trading in fish meal and scrap in the Baltimore area was practically at a standstill. A much firmer tone was reported in phosphates.

While shipments of raw fertilizer materials were still relatively small last month the open winter is expected to bring about earlier activity by the mixers. Although some of the sulfate producing plants were in the path of the flood little interruption to production was reported and stocks were moved to safety.

Marking the 4th year of improvement and reflecting the continuation in the rise in farm income, fertilizer tax tag sales in the reporting states increased 11% in '36 over '35 and were the largest for any year since 1930. Sales in the 17 reporting States totaled 4,789,871 tons in 1936, compared with 4,321,583 tons in 1935, 2,798,259 tons in the depression low year of '32 and 6,001,336 tons in '30. On the basis of tax tag sales, it seems likely that fertilizer consumption in the entire country in '36 was not much below 7,000,000 tons.

According to reports by State officials to The National Fertilizer Association, sales in the 12 Southern States showed a 9% gain in 1936. Increases were reported by every State with the exception of Oklahoma, which has a relatively small tonnage. A particularly sharp rise occurred in Florida, with tonnage in the State at a new high point.

A larger relative increase took place in the Midwest than in the South, with the 5 Midwestern States reporting an aggregate increase of 33% and with a good gain being shown by each state. Consumption in Indiana and in Missouri was the highest on record.

The rise in sales during the fall season was particularly sharp, with a 29% increase over last year reported in the South in the July-December period and a 48% gain in the Midwest. Increase in fall wheat acreage was probably responsible in part for the rise in the midwestern states. Trend of tag sales in recent years is shown in the following tabulation, with sales in each year shown as a percentage of 1930 sales:

Important Price Changes

ADVANCED	Jan. 30	Dec. 31
Ammonium sulfate	$27.00	$26.00
Blood, dried, N. Y.	4.30	4.25
Chgo.	4.65	4.50
Imported	4.10	3.90
Bone, raw, Chgo.	28.00	23.00
Castor pomace	23.00	20.00
Cyanamid	1.12½	1.10
Hoof meal	3.50	3.00
Nitrogenous material, East	3.60	3.50
Superphosphate, 16%	8.25	8.00
Run of pile	8.00	7.50
Tankage, N. Y.	4.40	4.25
Chgo.	4.00	3.75
Imported	4.25	4.00

DECLINED
None.

	1930	1931	1932	1933	1934	1935	1936
12 Southern	100.0	72.9	47.1	56.4	63.9	71.3	76.2
5 Midwestern	100.0	79.5	40.5	46.5	64.8	82.1	107.3

Superphosphate Production, etc.

November superphosphate production was 37% larger than in November '35, making the 9th consecutive month in which production exceeded the corresponding month of last year. For the first 11 months of the year production in the reporting plants was 18% larger than in the same period of '35. Increase has been especially marked during the fall season; production in the January-June period showed an increase of only 9% compared with 30% gain in the July-November period.

Total November shipments were much larger than in November '35 as a result of greater shipments to acidulators. All classes of shipments have been larger in the first 11 months of this year than in the entire year '35. The smallest relative increase has been in shipments in base and mixed goods, but they have been 9% greater this year than in January-November 1935.

Exports, Imports

November exports and imports of fertilizers and fertilizer materials showed declines from the unusually large volumes which were registered in October, and were also less than in November of last year.

November export tonnage totaled 138,442 short tons, a decline of 20% from the corresponding month of last year, but it was somewhat larger than November '34. The value was $1,357,000 representing a decline of 28% from last year.

N.F.A. Wants No Changes

The National Fertilizer Association has in a brief submitted to the Federal Trade Commission defended the trade practice rules suggested by the organization and has requested the commission to withdraw the changes made, particularly those having to do with the open price-filing rule. The industry has been plagued with ruinous competition for years and the rules as suggested by the N.F.A. were designed to protect both the seller and buyer. The brief points out that sales are largely restricted to a comparatively few weeks in the year and that for this reason special and peculiar methods are a vital necessity to preserve the stabilization so necessary for the welfare of the industry.

Textile, Tanning Chemicals

Consumption of chemicals, dyes, and specialties in the textile and leather fields continued very satisfactory during the first month of the new year, although most buyers are still holding to a hand-to-mouth purchasing policy in most items.

Rayon production established a new all-time record in '36 and the producers are experiencing great difficulty in keeping up with the urgent demand. Most woolen plants are sold up and unable to accept orders specifying delivery before Easter. Consumption of 692,921 bales of cotton in December compared favorably with 626,695 bales in November and 499,773 bales in December of '35 and was the third largest consumption in history. Hosiery shipments in '36 were 10% greater than in '35 and constituted an all-time record. Silk deliveries in December totalled 41,627 bales, a figure well ahead of estimates and a sizable gain over the previous December. Reports from the cotton and silk centers plainly indicate that the high rate of activity continued uninterrupted in January, except in a few places where labor troubles have arisen.

Shoe manufacturing centers are very busy. Highly encouraging is the fact that stocks, despite the record production of last year, are low. Tanners have in many instances been forced to step up production schedules.

Important Price Changes

ADVANCED	Jan. 30	Dec. 31
Albumen, egg	$0.78	$0.77
Egg yolk	.53	.52
Gambier cubes, Singapore	.09½	.07
Myrobalans	28.00	24.50
Sulfonated oils	all grades 1c	
Sumac	65.00	61.00
Zinc dust	.0790	.0735
DECLINED		
Corn starch, pearl	$3.78	$3.80
Corn syrup, 42°	3.76	3.80
43°	3.86	3.90
Corn sugar, tanners	3.84	3.88

Very few price changes were announced last month. The gradual firmness which has been developing for some months in the sulfonated oils finally resulted in a definite 1c advance. With the oils and fats markets rising rapidly producers of sulfonated oils were compelled to rearrange quotations at higher levels.

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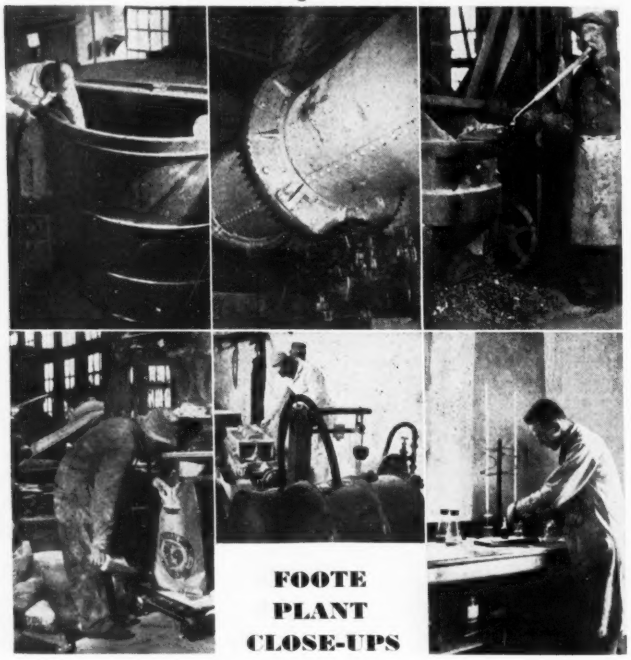

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Stock Values Appreciate But 2.8% In January

Market Moves Erratically With News Largely Bearish—Steels In Wide Advance—Chemical Stocks Sluggish—Du Pont to Declare Interim Dividends—

The market turned upward in the first month of the new year, but the net gain was but 2.8% for a list of 225 selected stocks. This was a reversal of the decline registered in December, the first month since last April to show a loss. The steels led the advance with an appreciation of 18% while chemical stocks gained less than one per cent. Even the motor stocks were up 2½% in spite of the strike. The net gains or losses in value for 10 of the leading chemical common stocks is shown as follows:—*

Air Reduction	—	$6,333,665
Allied Chemical	+	22,841,344
Commercial Solvents	+	2,057,268
du Pont	—	2,766,427
Freeport Sulphur	+	1,791,855
Mathieson Alkali	—	1,394,560
Monsanto Chemical	—	4,000,354
Texas Gulf Sulphur	+	4,320,000
Union Carbide	+	13,840,405
U. S. Indust. Alcohol	+	342,333
Total appreciation		$30,698,199

Du Pont Nets $7.56 a Share

Establishing a new record high since its stock split-up in 1928, du Pont has reported earnings of $7.56 per common share for the year ended Dec. 31st. Although the report is announced as a preliminary calculation, subject to verification by independent auditors, final figures are not expected to show appreciable variance.

Per share earnings of du Pont since the 1928 stock split-up follow: 1934, $3.66; 1933, $3.00; 1932, $1.82; 1931, $4.29; 1930, $4.26; 1929, $7.09.

Earnings of Leading Companies

Net earnings of Freeport Sulphur, formerly Freeport Texas, for '36 were $2,007,988.60 equivalent to $2.43 per share on the common after provision for preferred dividends. President Williams' report showed that the '36 earnings compare with net earnings for '35, of $1,492,108.56, or $1.78 per share on the 796,371 shares of common.

Report of Hercules Powder and subsidiaries for year ended Dec. 31st, shows net income of $4,284,164 after depreciation, federal income taxes and surtax on undistributed profits, etc., equivalent after deducting $590,544 preferred dividends paid, to $6.33 a share on 583,872 no-par shares of common stock, excluding shares held in treasury. This compares with $3,175,973 or $4.23 a share on 583,607 common in '35.

Preliminary report of Lindsay Light & Chemical for year ended Dec. 31st, '36, shows net income of $26,458 after depreciation, federal taxes, etc. equivalent after preferred dividends, to 18c a share on 60,000 shares of common. This compares with $51,957 or 62c a common share in '35.

Chilean Nitrate and Iodine Sales Corp. —Year to June 30: Net income after service on 5% income debenture, and extraordinary amortization of these debentures, £930,392, representing balance chargeable to accounts of producers. On same basis net income in preceding year amounted to £934,386. Under indenture, interest on 5% income debentures, while cumulative, is payable if and to extent earned.

Atlas Powder Co. for 1936: Net income, $1,430,080, equal to $4.21 each on 248,666 no-par common after preferred dividend requirements. Net income in 1935 was $1,161,169, or $2.81 a common share. Sales of $15,825,299 represented a gain of 21.5% over the $13,086,966 in '35. Current assets on Dec. 31, 1936, amounted to $9,563,270 and current liabilities were $1,276,896, compared with $8,934,758 and $824,923 on Dec. 31, 1935. Cash was $2,364,657, against $2,614,645.

Du Pont's New Dividend Policy

Du Pont has decided to adopt a change in its policy of dividend declarations on its common stock. It will, hereafter, declare an individual or "interim" dividend in each quarter depending on the conditions prevailing at that time rather than declare what have come to be regarded as "regular" quarterly dividends.

Heretofore the du Pont Company has followed the conventional practice in this country and has paid dividends on its common stock at a more or less uniform rate. It has endeavored to maintain this constant rate of distribution until a change seemed advisable because of a marked shift in economic or business trend. These distributions have been supplemented, from time to time, by "extra" dividends.

The Company has decided that there are important objections to this policy and, further, that it is subject to some misunderstanding on the part of the stockholders and the investing public.

One objection, from the standpoint of the corporation management has been that the board of directors, in the interest of uniformity, has felt somewhat constrained to maintain the uniform dividend rate at times when the Company's financial position or the current economic conditions warranted a change in the rate.

The management indicated that, while the quarterly "interim" dividends may differ one from another, the fluctuation should not be as wide as the difference heretofore experienced between the uni-

* Chemical stocks on Feb. 1st had a value of $6,649,478,222 and an average price of $81.40, as compared with $6,502,233,633 and $79.60 on Jan. 1st, a net gain of $147,244,589 in value and $1.80 per average share.

Dividends and Dates

Name	Div.	Stock Record	Payable
Allied Chem. & Dye, q	$1.50	Jan. 11	Feb. 2
Am. Smelt & Rfg., q	75c	Jan. 29	Feb. 27
Archer-Daniels-Midland, pf., q	$1.75	Jan. 21	Feb. 1
Atlantic Refining, pf., q	$1.00	Jan. 5	Feb. 1
Atlas Powder, pf., q	$1.25	Jan. 26	Feb. 1
Barnsdall Oil, q	25c	Jan. 14	Feb. 1
Bon Ami, Cl. B	62½c	Jan. 18	Jan. 30
Bon Ami, Cl. A, q	$1.00	Jan. 18	Jan. 30
Colgate-Palmolive-Peet, q	12½c	Feb. 5	Mar. 1
Colgate-Palmolive-Peet, pf., q	$1.50	Mar. 5	Apr. 1
Cook Paint & Varn., pf., q	$1.00	Feb. 20	Mar. 1
Dow Chem.	60c	Feb. 1	Feb. 15
Dow Chem., pf., q	$1.25	Feb. 1	Feb. 15
Freeport Sulphur, q	25c	Feb. 15	Mar. 1
Freeport Sulphur, 6%, q	$1.50	Apr. 15	May 1
Glidden Co., q	50c	Mar. 17	Apr. 1
Glidden Co., pf., q	56¼c	Mar. 17	Apr. 1
Hercules Powd., pf.	$1.50	Feb. 4	Feb. 15
Internat. Nickel, pf., q	$1.75	Jan. 2	Feb. 1
Internat. Print. Ink	50c	Jan. 21	Feb. 1
Internat. Print. Ink, pf., q	$1.50	Jan. 21	Feb. 1
Monsanto, ext.	25c	Feb. 25	Mar. 15
Monsanto, q	25c	Feb. 25	Mar. 15
Nat. Lead, Cl. A, pf., q	$1.75	Feb. 26	Mar. 15
Nat. Lead, Cl. B, q	$1.50	Jan. 18	Feb. 1
Procter & Gamble, ext.	25c	Jan. 22	Feb. 15
Procter & Gamble, q	50c	Jan. 22	Feb. 15
Sherwin-Williams	$1.00	Jan. 30	Feb. 15
Sherwin-Williams, 5% pfd., q	$1.25	Feb. 15	Mar. 1
Skelly Oil, 6% pf., q	$1.50	Jan. 5	Feb. 1
Solvay Am., 5½%, q	$1.37½	Jan. 15	Feb. 15
Smith Agric.	12½c	Jan. 21	Feb. 1
Smith Agric., pf., q	$1.50	Jan. 21	Feb. 1
Sun Oil, q	25c	Feb. 25	Mar. 15
Sun Oil, pfd., q	$1.50	Feb. 10	Mar. 1
Texas Corp.	50c	Feb. 15	Apr. 1
Tide Water	15c	Feb. 9	Mar. 1
Tubize, 7% pf.	$5.25	Jan. 9	Feb. 1
Westvaco Chlorine, 5%, pf.	37½c	Jan. 11	Feb. 1
Westvaco Chlorine, q	25c	Feb. 15	Mar. 1

Price Trend of Chemical Company Stocks

	Dec. 31, 1936	Jan. 8, 1937	Jan. 15	Jan. 22	Jan. 30	Net Gain or loss last month	Price on Jan 31, 1936	1937-'36 High	1937-'36 Low
Air Reduction	78	79⅝	76½	78½	75½	— 2½	189a	86½	58
Allied Chemical	226½	234	234	236	236	+ 9½	165	245	157
Columbian Carbon	120	120⅛	119⅜	123¾	120¼	+ ¼	107⅝	136½	94
Com. Solvents	18¾	18½	19⅜	20⅜	19⅝	+ ⅞	20¾	24⅝	14¼
du Pont	173	179½	179¼	174	172¾	— ¼	146¼	184¾	133
Hercules Powder	146	160	166	178	181	+35	87⅝	182	84
Mathieson	40½	41	39¾	40½	38⅞	— 1⅝	31¼	42⅜	27½
Monsanto	98	97¾	96	97⅛	94½	— 3½	95½	103	79
Std. of N. J.	68¾	68⅛	68¾	69	69½	+ ¾	59⅝	71½	51⅛
Texas Gulf S.	39¼	40¾	40½	40⅞	40⅜	+ 1⅛	37¼	44¾	33
Union Carbide	103¾	104	103¾	105¼	105¼	+ 1½	76	105⅞	71⅝
U. S. I.	38¾	37½	39	39	39⅝	+ ⅞	41¼	59	31¼

a Old stock.

form dividend in one period and the total of the uniform and "extra" dividends in another period. Also, it was stated that the total distribution for the year should not differ materially, if at all, because of this change in policy, from the total distribution which might have been made for the same year under the old practice.

Westvaco Acquires Calif. Chemical

Westvaco Chlorine Products has applied to the N. Y. Stock Exchange for the listing of 54,400 shares of additional common to stock which it is proposed to offer in exchange for the assets of California Chemical.

Westvaco plans to construct a new plant at Newark, Cal., to cost around $1,000,000 to make magnesite and other compounds from brine to augment the ore deposits.

California Chemical has total assets of about $1,586,276 and had a net profit of $43,925 on $996,000 sales in 11 months ended Nov. 30, '36.

Bonds Called For Redemption

Hooker Electrochemical has called all of the outstanding 1st mortgage 25-year 6% s. f. gold bonds series B, due Dec. 1, 1953 for redemption on Feb. 15th at 104 and interest.

Chase National, as successor trustee, invited last month tenders for the sale to it at prices not exceeding 101½ and interest, of an amount of 1st mortgage sinking fund gold bonds of West Disinfecting due July 1, 1940, sufficient to exhaust the sum of $11,390 now held in the sinking fund.

Extends Exchange Period

Certain-teed Products has extended to Feb. 23rd the time for exchange of its 7% preferred for common and 6% cumulative prior preference stock, as provided in the company's recapitalization plan of May 27, 1936.

U. S. Potash Files With SEC

United States Potash has filed an SEC registration statement covering 25,000 shares ($100 par) 6% cumulative preferred stock of which 10,786 shares are outstanding. Of the remaining 14,214 shares, 4,214 shares are presently to be offered. Proceeds are to be used to reduce bank loans. William R. Staats Co., of Los Angeles, is the underwriter. Henry McSweeney, of Atlantic City, is president.

Swan Finch Reports $42,000

Swan Finch Oil earned approximately $42,000, after all charges in the first 6 months of its fiscal year ended Dec. 30th, or slightly better that $1 a share. In the like period last year, the company earned $46,000 after all charges. Decrease in earnings for the 6 months ended Dec. 31st is attributable to the fact that the company has set up a reserve in anticipation of meeting requirements of the undistributed profits tax.

Solvay Amer. Redeems Preferred

Solvay American Investment, has called for redemption 2,020 shares of its 5½% cumulative preferred stock, drawing by lot having taken place Jan. 5th, according to notice received by the committee on stock list of the Stock Exchange. Stock will be redeemed on Feb. 15th at $110 per share plus $1.37½ per share, representing accrued dividends to that date. J. P. Morgan & Co is paying agent.

Davison Revamps Subsidiaries

Central Chemical, subsidiary of Davison Chemical has decreased its capital stock to 50 shares of common of no par value. Miller Fertilizer, another subsidiary, has reduced its capital stock to two shares of preferred stock of a par value of $100 a share and 48 shares of common of no part value, while the G. Ober & Sons Co., a 3rd affiliate, has reduced its capital stock from 4,000 shares of a par value of $100 a share to 50 shares of $100 par.

Renews Recommendation

The Foreign Bondholders Protective Council has renewed its recommendation that holders of Chilean bonds do not accept the partial payment offered them by the Chilean government. The same recommendation was made last year.

Adams Express Reports

Adams Express, first of the investment trusts to report for '36 shows the following changes in its holdings of stocks of chemical companies and others closely allied to that field:

	Dec. 31, '36	*Dec.* 31, '35	*Inc.*	*Dec.*
Gulf Oil Corp	10,000	.....	10,000	....
Mid-Continent Pete..	30,000	21,300	8,700	....
Petrol. Corp. of Am.	100,000	50,000	50,000	....
S. O. of Calif.	20,000	14,200	5,800	....
S. O. of N. J.	10,000	12,500	.....	2,500
Texas Corp.	15,000	.....	15,000	....
Allied Chemical	7,300	6,000	1,300	....
Union Carb. & Carb.	15,000	20,000	.....	5,000
Cont'l Diamond Fibre	19,000	20,000	.....	1,000
Am. Smelt. & Ref. ..	.....	10,000	.....	10,000
Consolidate Oil Corp.	.....	20,000	.....	20,000
Pan. Am. Pet. & Tr.	.....	5,000	.....	5,000
Socony-Vac. Oil Co.	.....	16,500	.....	16,500

Seaboard Decreases Capital

Seaboard Chemical Products, Baltimore, has decreased its capital stock to 2,000 shares of $10 preferred and 500 shares of common with no par value.

Extra Declared

Companies declaring extras last month included P. & G. with a 25c extra and a quarterly of 50c which was announced as placing the stock on a $2 basis.

Simplifies Stock Structure

Compressed Industrial Gases, Inc., in order to effect a simplification of its corporate structure, liquidated all of its wholly-owned subsidiaries, as of Dec. 31st, and all of their property and assets have been transferred to the parent company.

Subsidiaries liquidated were:—Burdett Oxygen & Hydrogen of Chicago, Burdett Oxygen of Detroit, Burdett Oxygen Company of Texas, the Burdett Oxygen of Chattanooga, Burdett Oxygen Co., the Wisconsin Oxygen-Hydrogen Co., the Mo-Ark Oxygen Co., and the Butler Gas Products.

Wall St. Gossip

That I.A.C. may soon announce a plan of recapitalization to take care of the large accruals and that this will be done with cash and common stock.

Pittsburgh Plate Glass' Business in '36 was up 25% over the previous year. According to President Wherrett, a further increase of 10 to 15% in '37 is quite likely unless labor troubles interfere.

Glidden's net profit for the year ending Oct. 31, 1936 was up 16%.

A. A. C. Nets $161,694

American Agricultural Chemical of Delaware and Subsidiaries—Six months to Dec. 31st: Net profit, $161,694, equal to 76c each on 210,934 no-par capital shares. In the final half of 1935 there was a net loss of $97,716.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1936	Net income 1935	Common share earnings 1936	Common share earnings 1935	Surplus after dividends 1936	Surplus after dividends 1935
American Agricultural Chemical:							
Six months, Dec. 31	$4.00	$161,694	†$97,716	$0.76	....	......	......
Atlas Powder:							
Year, Dec. 31	*k*3.50	1,430,080	1,161,169	4.21	$2.81	......	......
Catalin Corp.:							
Year, Dec. 31	*w*.40	281,055	254,428	.52	.47	$66,298	......
Devoe & Raynolds:							
Year, Nov. 30	§3.00	707,210	530,063	4.49	2.88	336,701	$119,500
Freeport Sulphur:							
n Year, Dec. 31	1.00	2,007,988	1,492,108	2.43	1.78	......	......
Hercules Powder:							
Year, Dec. 31	*k*5.25	4,284,164	3,175,973	6.33	4.23	......	......
Lindsay Light & Chemical:							
n Year, Dec. 31	*f*....	26,458	51,957	.18	.62	......	......
Procter & Gamble:							
Dec. 31 quarter	§2.00	6,730,202	4,278,858	1.02	.64	*......	*......
Six months, Dec. 31	§2.00	13,359,766	7,883,363	2.03	1.17	*......	*......
Westvaco Chlorine Products:							
Nine months, Oct. 2	1.00	419,205	......	.98	....	......	......

† Net loss; *k* Paid in year 1936; *w* Last dividend declared; § Plus extras; *n* Preliminary report; *f* No common dividend; * Not available.

Chemical Stocks and Bonds

Last (1937 January)	High (1937 January)	Low (1937 January)	High (1936)	Low (1936)	High (1935)	Low (1935)	Sales: Number of shares Jan. 1937	Sales: Number of shares 1937	Stocks	Par $	Shares Listed	Dividends*	Earnings $-per share-$ 1936	Earnings $-per share-$ 1935
NEW YORK STOCK EXCHANGE														
75½	80¼	75	86½	58	57½	35	19,700		Air Reduction	No	2,523,864	$2.50	.....	2.10
236	238⅝	225	245	157	173	125	12,000		Allied Chem. & Dye	No	2,214,099	6.00	.....	8.71
95¼	101½	83	89	49	57¾	41½	12,500		Amer. Agric. Chem.	100	315,701	2.25	.....	*p*4.71
27¼	28¾	26⅜	35⅜	20½	35¾	22½	22,000		Amer. Com. Alcohol	20	260,716	.50	.....	3.16
44¾	45½	41	50	37	52	36	8,200		Archer-Dan-Midland	No	549,546	3.00	.....	*p*3.05
85⅛	85⅛	72¼	84	48	48½	32¾	3,600		Atlas Powder Co.	No	248,660	3.50	4.21	2.81
129	128	133	131	112	115	106¾	580		5% conv. cum. pfd.	100	88,781	5.00	.....	16.93
30⅜	31⅝	26⅝	32¼	21¾	35⅜	19½	190,700		Celanese Corp. Amer.	No	987,800	1.50	.....	1.99
108	108½	106½	116	106	111¼	97½	1,800		prior pfd.	100	263,668	7.00	.....	.....
19⅝	21⅝	19½	21¼	13	21	15⅛	93,600		Colgate-Palm.-Peet	No	1,985,812	.75	.....	1.36
103½	104½	103	106½	100	107¼	101	2,100		6% pfd.	100	254,500	6.00	.....	16.79
120¼	123¾	117½	136½	94	101¼	67	4,700		Columbian Carbon	No	538,154	5.75	.....	5.56
19⅝	21¼	18⅛	24⅝	14¼	23⅞	16½	326,700		Commercial Solvents	No	2,635,371	.80	.....	1.02
70	71¼	67	82½	63⅝	78⅜	60	29,800		Corn Products	25	2,530,000	3.75	.....	2.62
168	171½	168	170	158	165	148¼	1,000		7% cum. pfd.	100	243,739	7.00	.....	33.97
67¼	68	61	63	42	50⅜	35½	2,900		Devoe & Rayn. A	No	95,000	2.00	4.49	2.89
172¾	180⅛	169	184¾	133	146½	86⅝	38,100		DuPont de Nemours	20	10,871,997	6.10	.....	5.04
133	135	133	136½	129	132	126⅞	2,200		6% cum. deb.	100	1,092,699	6.00	.....	56.94
169	175⅛	167½	185	156	172¼	110½	7,000		Eastman Kodak	No	2,250,921	6.75	.....	6.90
163	163	159	166	152	164	141	120		6% cum. pfd.	100	61,657	6.00	.....	258.09
29½	32¼	26¾	35⅝	23½	30⅝	17¼	95,400		Freeport Texas	10	784,664	1.00	.....	1.78
109½	109½	109½	135	108	125	112½	80		6% conv. pfd.	100	25,000	6.00	.....	121.30
51	51½	43⅝	55¼	39½	49½	23⅜	58,800		Glidden Co.	No	603,304	2.00	....	.....
57¼	58⅛	55⅛	56	52¼			2,700		4½% cum. pfd.	50	200,000	2.25	....	.....
103	103	101	133	99⅝	119½	85	4,500		Hazel Atlas	25	434,409	7.64	.....	7.58
181	182	150½	5⅞	2⅞	90	71	6,200		Hercules Powder	No	583,672	5.44	6.33	4.23
133	133¼	129¾	47¼	22¾	131	122	70		7% cum. pfd.	100	105,765	6.00	.....	36.30
36⅞	40½	36¼	66⅜	43¼	36⅜	23½	32,300		Industrial Rayon	No	600,000	2.10	.....	1.00
7½	8	5	30	23	5	2⅝	188,700		Intern. Agricul.	No	436,049	None	.....	*p*1.55
56½	58	42	36¾	29¾	42¾	26	39,400		7% cum. pr. pfd.	100	100,000	None	.....	*p*2.23
63⅜	64⅝	62⅛	80¼	47¼	47¼	22¼	149,200		Intern. Nickel	No	14,584,025	1.30	.....	1.65
27½	28¾	26¼	46½	32½	36¼	25	2,800		Intern. Salt	No	240,000	2.00	.....	1.32
35	36	33¼	42⅜	27½	36¼	31	3,000		Kellogg (Spencer)	No	500,000	1.60	.....	.....
77	79	67¼	103	79	49¼	21½	55,100		Libbey Owens Ford	No	2,559,042	3.50	.....	3.26
49½	52	43⅜	36½	26⅜	37¼	24½	31,100		Liquid Carbonic	No	342,406	1.60	.....	*v*3.06
38⅞	41¾	38¼	171	155	33⅞	23¾	13,200		Mathieson Alkali	No	650,436	1.50	.....	1.44
94½	101	94½	147	137¾	94¾	55	13,100		Monsanto Chem.	10	864,000	3.00	.....	3.84
36	37⅞	33¾	40	9	20⅝	14⅛	43,400		National Lead	10	3,098,310	.875	.....	1.08
171	171	170	164	125	162½	150	300		7% cum. "A" pfd.	100	243,676	7.00	.....	25.40
146½	150	144	56	40¼	140½	121⅝	230		6% cum. "B" pfd.	100	103,277	6.00	.....	49.05
38¼	41¾	34¾	122½	115¾	10⅞	4⅜	200,000		Newport Industries	1	519,347	.60	.....	.57
159	160⅛	150	13	5⅝	129	80	3,400		Owens-Illinois Glass	25	1,330,602	6.00	7.53	6.52
63½	65½	55½	146	84	53¾	42⅜	66,900		Procter & Gamble	No	6,410,000	1.87	.....	*p*2.39
118½	118½	117	135	126	121	115	560		5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	*p*94.14
12½	14⅛	11⅞	41⅜	25⅝	8¾	4	110,300		Tenn. Corp.	5	857,896	.15	.....	.22
40⅜	43	38¾	44¾	33	36¾	28¾	43,300		Texas Gulf Sulphur	No	2,540,000	2.50	.....	1.94
105¼	105⅞	101½	105¼	71⅝	75¾	44	41,600		Union Carbide & Carbon	No	9,000,743	2.30	.....	3.06
89½	89½	79	96¾	68	78	46	8,500		United Carbon	No	370,127	4.05	.....	4.71
39⅝	41¼	37½	59	31¼	50⅝	35⅛	56,800		U. S. Indus. Alco.	No	391,033	1.00	.....	2.16
31½	32⅜	28¼	30½	16¼	21¾	11¼	144,300		Vanadium Corp.-Amer.	No	366,637	None	.....	—1.13
8¾	9½	7⅜	8½	4⅛	4⅝	2½	137,400		Virginia-Caro. Chem.	No	486,000	None	.....	*p*2.56
58¼	61½	54½	58¾	28¾	35¾	17½	56,800		6% cum. part. pfd.	100	213,392	None	.....	*p*.16
25	26	23½	32	19¾	25½	16¾	11,200		Westvaco Chlorine	No	284,962	.75	.....	1.63
33¾	34⅞	33	35¼	31¾			5,400		Westvaco Chlorine, cum. pfd.	30	192,000	1.50	.....	.....
NEW YORK CURB EXCHANGE														
33½	35⅞	33	40¾	29¼	30	15	54,400		Amer. Cyanamid "B"	No	2,404,194	1.00	.....	1.61
2⅜	2⅜	2⅛	3¾	2⅛	4	2	700		British Celanese Am. R.	10	2,806,000	None	.....	—.71%
110¾	110¾	108½	116¼	99¼	115	90	475		Celanese, 7% cum. 1st pfd.	100	144,379	7.00	.....	21.96
11	13½	10⅛	16½	9	15	7	2,900		Celluloid Corp.	15	194,952	None	.....	—.95
14	14	14	15	11⅞	14½	11⅝	200		Courtaulds' Ltd.	1 £	24,000,000	7½%	.....	7.51%
150	159¼	135	142¼	94⅛	105½	80½	4,800		Dow Chemical	No	945,000	2.40	.....	4.42
9½	10⅝	6¾	10¾	5	12½	6¼	29,100		Duval Texas Sulphur	No	500,000	.50	.....	.16
42	42	39⅞	55	39	58	37	1,400		Heyden Chem. Corp.	10	147,600	2.25	.....	3.22
142½	144½	125	140	98¼	97¼	46¾	10,900		Pittsburgh Plate Glass	25	2,141,305	6.00	.....	5.32
144½	148½	133	154½	117	128⅞	84	10,250		Sherwin Williams	25	635,583	4.00	.....	.....
111	114	110½	116	110	113½	106	400		5% pfd. cum.	100	155,521	5.00	.....	
PHILADELPHIA STOCK EXCHANGE														
170	170	162	179	114¼	116¾	76½	670		Pennsylvania Salt	50	150,000	8.50	.....	*v*8.57

Last (1937 January)	High (1937 January)	Low (1937 January)	High (1936)	Low (1936)	High (1935)	Low (1935)	Sales Jan. 1937	Sales 1937	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
108¾	109¼	108	117½	107¾	116	104½	628,000		Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
38½	39	36½	42½	27½	29¾	7⅜	500,000		Anglo Chilean Nitrate inc. deb.	1967	4½-5		12,433,000
103	103	102⅛	102¾	92½	94½	77⅓	41,000		By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
102	102	101¼	102¾	96¾	100¼	91⅛	13,000		Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
40	40	37	39	21	21½	7	555,000		Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
24¼	24¼	22½	35	23½	38	32⅛	2,000		Ruhr Chem. 6's	1948	6	A. O.	3,156,000
104¾	105	104¾	105	103	104	91½	17,000		Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
103	105	98¼	98½	85¾	94¼	66	213,000		Vanadium Corp. conv. 5's	1941	5	A. A.	4,261,000

† Year ended 5-31-35; *p* Year ended 6-30-35; *v* Years ended 6-1-35 and 6-1-36; *y* Year ended 8-31-35; *z* Year ended 8-31-35; * Paid in 1936, including extras; *x* Year ended 10-31-35.

Industrial Trends

Business Activity in January But Slightly Affected by Strikes and Floods—General Motors' Labor Troubles Become More Serious—Industry Fears New Wave of Adverse Legislation in Washington—

Despite some very unfavorable angles business activity stood up remarkably well in the first month of the new year. The flood cut into carloadings, steel operations and the operations of plants situated in the afflicted areas. A bright side to an otherwise dismal outlook in these regions is the large amount of replacements that will be necessary later. Business boomed in the Pittsburgh flood area last year and a similar situation is anticipated in Cincinnati and Louisville as soon as the waters have receded.

The labor strife at the General Motors' plants became much more serious last month. Attempts to bring together the strikers and the management have failed. Executives of the company insist that the sit-down strikers must leave the idle plants and on Feb. 2nd were successful in obtaining a court order for the ejection of the men illegally holding possession of the factories. In the meantime automotive and accessory production has declined rapidly.

Retail Trade 12% Higher

Retail trade has held up remarkably well and sales are approximately 8 to 12% above the corresponding period of a year ago. Wholesale trade is nearly 15 to 20% ahead. This is partially due to the fact that Easter comes much earlier this year.

Outlook for Steel

While steel activity declined about 3% as a result of the floods, buying is still heavy, and any sudden ending of the automotive labor troubles would probably force steel production above the 80% level. According to reports, there is considerable export business being placed.

Carloadings ran between 8 and 15% ahead of the corresponding weeks of 1936, while the gains in electrical consumption were from 14 to 21%. Commodity prices generally continued to advance in the past 4 weeks. The metals, except tin, were marked up, the rise in copper being properly termed "sensational." Some nervousness was apparent in the futures for rubber, silk, cottonseed, and lard.

Manufacturers of safety glass have reached a settlement with the labor representatives and plants are being put in shape for operations. Activity in both textiles and tanning has held up remarkably well and the outlook over the first quarter of '37 is very favorable in both fields. Seasonal dullness prevails in the paint group, but producers anticipate an even better year than last and are therefore preparing for a very heavy season. An optimistic tone prevails in the fertilizer industry. Mixers expect at least a 10% increase in tonnage and more stable prices.

With the opening of Congress some of the old legislative uncertainties have returned anew. A modified NRA is a possibility. Congress is flooded with proposed bills, several of which have a very direct interest to industry and business.

The consumption of chemicals in January was much better than in the corresponding month of the previous year. Yet the volume failed to reach the more optimistic estimates made at the turn of the year. However, very decided improvement is quite likely over the next 60 days, especially so if the auto strike is settled. On the other hand, prolonged strife and the possible spreading of labor difficulties to other industries including the steel field would seriously curtail the usual spring expansion in industrial activity. The sit-down strike has proven to be a powerful labor weapon, but that it is illegal possession and a violation of private property rights there is no question. Unless a speedy clearing of the labor problem is reached business and industry will likely be plagued for several months by uncertainty and recovery will be seriously menaced. It is difficult for business leaders to forecast industrial trends under present conditions.

Revised Stoddard Standard

Revision of the official commercial standard (CS3-28) for Stoddard solvent has been recommended by the Division of Trade Standards of the National Bureau of Standards. Major changes are the substitution of a temperature of 375° F. for 90% distillation for 350° F. for 50% distillation, and the addition of a requirement covering maximum residue.

Record Leaded Gas Consumption

Consumption of leaded gasoline in the automobiles of this country reached the record figure of 13,335,000,000 gallons during '36, according to a report made public by Ethyl Gasoline Corp.

This aggregate exceeds that of '35 by 1,317,000,000 gallons.

Asks for Receiver

Suing as a stockholder, Max Stitch president and secretary of the Oxide Color & Chemical, Bayway, N. J., is asking for a receiver for the company.

Statistics of Business

	December 1936	December 1935	November 1936	November 1935	October 1936	October 1935
Automotive Production	498,721	404,528	394,890	395,059	224,628	272,043
Bldg. Contracts*‡	$199,695	$264,126	$208,204	$188,115	$225,839	$200,595
Failures, Dun & Bradstreet	692	910	688	898	611	1,056
Merchandise Imports‡	$239,835	$179,760	$196,423	$169,385	$215,525	$161,647
Merchandise Exports‡	$226,605	$220,931	$225,766	$269,838	$219,967	$198,803
Newsprint Production						
Canada, tons	......	......	285,771	262,854	301,106	266,515
U. S., tons	......	......	79,853	78,929	81,027	79,746
Newfoundland, tons	......	......	28,201	28,567	30,677	29,744
Plate Glass, prod., sq. ft.	7,371,236	16,112,218	13,083,963	15,909,262	20,752,657	16,592,803
Steel ingots production, tons	4,431,000	3,073,000	4,337,000	3,150,000	4,545,001	3,142,759
Steel activity, % capacity	......	......	......	......	......	......
Pig iron production, tons	3,095,145	2,106,453	2,947,000	2,065,000	2,991,887	1,978,411
U. S. consumption, crude rubber, tons	49,626	42,942	50,303	42,310	49,509	41,969
Tire shipments	......	......	......	......	4,081,023	4,054,147
Tire production	......	......	......	......	5,123,467	4,050,509
Tire inventory	......	......	......	......	10,088,510	8,290,594
Dept. of Labor Indices†						
Factory payrolls, totals†	94.6	77.4	90.1	75.5	88.8	76.3
Factory employment†	97.7	88.2	96.6	88.7	96.5	89.3
Chemical employment†*a*	119.2	112.3	119.4	113.8	120.2	115.5
Chemical payrolls†*a*	118.4	101.1	113.4	100.4	113.9	103.0
Chemicals and Related Products						
Exports‡	......	......	......	$10,465	$10,831	$3,959
Imports‡	......	......	......	$6,685	$7,719	$5,010
Stocks, mfg. goods	......	......	120	118	121	117
Stocks, raw materials	......	......	110	111	107	115
Boot and shoe production	......	......	29,797,379	27,714,841	39,361,698	35,947,810

Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output§ 1937	Electrical Output§ 1936	Electrical Output§ % of Change	Jour. of Com. Price Index	National Fertilizer Association Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Jan. 2	587,953	541,826	+ 8.5	2,069,266	....	.....	86.7	93.6	93.0	69.8	75.9	84.0	86.1	79.4	103.0	112.7
Jan. 9	698,529	614,853	+13.6	2,244,030	1,854,874	+21.0	88.3	93.6	94.7	70.7	75.9	85.5	86.8	78.8	105.5	111.0
Jan. 16	700,238	611,347	+14.5	2,264,125	1,970,578	+14.9	87.3	94.4	94.9	70.7	75.8	85.5	87.9	80.6	105.3	110.2
Jan. 23	670,376	584,637	+14.7	2,256,795	1,949,676	+15.7	86.6	94.4	93.4	71.1	75.8	85.0	88.0	77.9	....	110.9
Jan. 30	659,790	621,890	+ 6.1	....	....	.....	87.2	94.4	92.2	71.2	75.8	84.6	....	....	....	110.6

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; *y* Preliminary; *z* Revised.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1936 $1.19 - Jan. 1937 $1.11

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt allowed lb.	.14	.15	.14	.15		.15
Acetin, tech, drs lb.	.22	.24	.22	.24	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.06	...	.06	.06	.11
drs, c-l, f.o.b. wks, frt allowed lb.		.07	...	.07	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.06¾	.07	.06¾	.07	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.25	2.25	2.45	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.00	8.00	8.43	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.50	10.50	12.43	...	12.43
Adipic, kgs, bbls lb.	...	.72		.72	...	.72
Anthranilic, ref'd, bbls lb.	.85	.95	.85	.95	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, delv 100 lbs.	1.35	2.50	1.35	2.50	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00		95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs lb.	...	.22	...	.22	...	.22
wks lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.25	.26	.25	.26	.25	.29
anhyd, gran, bbls lb. *b*		.29		.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.72	.74	.72	.74	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	.77	.79	.77	.79	.68	.79
resin grade, drs, wks, frt equal lb.	.09	.09½	.09	.09½	.52*y*	.65*y*
Crotonic, drs lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb. drs lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls lb.	.65	.68	.65	.68	.65	.68
USP, bbls lb.	.77	.80	.77	.80	.70	.80
Gamma, 225 lb bbls, wks lb.		.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.45	.50	.45	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.16	.16	.16	.16	.16
Maleic, powd, kgs lb.	.29	.32	.29	.32	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.35	...	1.35	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.45	...	1.45		1.45
tks, wks 100 lb.	...	1.10	...	1.10	1.10	1.20
22°, c-l, cbys, wks 100 lb.	...	1.95	...	1.95	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.11	.14	.11	.14	.11	.14
Sludges, drs lb.	.06	.10	.06	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.30	.40	.30	.40	.30	.40
Propionic, 98% wks, drs lb.		.22	...	.22		.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, crys, kgs, wks lb.	1.55	1.65	1.55	1.65	1.55	1.65
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	...	.58	...	.58	...	.58
Succinic, bbls lb.		.75		.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	12.00	...	12.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50		18.50	...	18.50
Tannic, tech, 300 lb bbls lb	.19	.36	.19	.36	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	...	.21¾	...	.21¾	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.		1.75		1.75		1.75
Tungstic, tech, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.50	.60	.50	.60	.50	.60
dark, bbls lb.	.12	.17	.12	.17	.12	.17
egg, edible lb.	.78	.79	.78	.79	.77	1.05
vegetable, edible lb.	.65	nom.	...	nom.	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	.08½	.108
Benzyl, bottles lb.	.65	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.08½	...	.08½	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.09½	...	.09½	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.07	...	.07	.07	.096
c-l, drs, delv lb. *d*	...	.08	...	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.50	3.65	2.50	3.65	2.50	3.65
Denatured, CD, No. 11, 12, 13, c-l, drs, wks gal. *e*	...	.33	...	.33	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.39	...	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.26	...	.26	.23	.28
c-l, drs, wks gal. *e*	...	.29	...	.29	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.16	...	.16	...	.16
c-l, drs, delv lb. *f*	...	.17	...	.17	...	.17

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers were given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Ethyl, 190 proof, molasses,						
tks ... gal. *g*	...	4.07	...	4.07	4.07	4.10
c-l, drs ... gal. *g*	...	4.11	...	4.11	4.11	4.27
c-l, bbls ... gal. *g*	...	4.12	...	4.12	4.12	4.28
absolute, drs ... gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½
Furfuryl, tech, 500 lb drs lb.	...	.35	...	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.11½	...	.11½	...	.11½
c-l, drs, delv ... lb.	...	.12½	...	.12½	...	.12½
Normal, drs, wks ... lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delvd ... lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs .. lb.	...	.10	...	.10	.10	.12
c-l, drs ... lb.	...	.09½	...	.09½	.09½	.11½
tks ... lb.	...	.08½	...	.08½	.08½	.10½
Isopropyl, refd, c-l, drs,						
f.o.b. wks, frt allowed .. lb.	...	.45	...	.45	.45	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.27	...	.27	.24	.32
Aldehyde ammonia, 100 gal						
drs ... lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb						
bbls ... lb.	...	.52	...	.52	.52	.65
Alphanaphthylamine, 350 lb						
bbls ... lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l,						
bbls, wks ... 100 lb.	...	3.00	...	3.00	...	3.00
25 bbls or more, wks 100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls,						
wks ... 100 lb	...	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls ... 100 lb.	7.00	7.25	7.00	7.25	7.00	7.25
Potash, lump, c-l, bbls,						
wks ... 100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls,						
wks ... 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, bbls,						
wks ... 100 lb.	...	3.00	...	3.00	...	3.00
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks ... 100 lb.	4.00	4.15	4.00	4.15	4.00	4.15
Aluminum metal, c-l, NY 100 lb.	19.00	20.00	19.00	20.00	19.00	20.00
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ... lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.07
Solution, drs, wks ... lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03½
Hydrate, 96%, light, 90 lb						
bbls, delv ... lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks ... lb.	.029	.03½	.029	.03½	.029	.04½
Oleate, drs ... lb.	.16¾	.18½	.16¾	.18½	.15¾	.18½
Palmitate, bbls ... lb.	.22	.23	.22	.23	.21	.22
Resinate, pp, bbls ... lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.18	.21
Sulfate, com, c-l, bgs,						
wks ... 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks ... 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs,						
wks ... 100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks ... 100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs						
... lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	*.16	.22	.16	.22	.15¼	.22
26°, 800 lb drs, delv ... lb.	.02¼	.02½	.02¼	.02½	.02¼	.03
Aqua 26°, tks, NH .. cont.	...	.04½	...	.04½	.04½	.05
tk wagon ... lb.	...	.02	...	.02	.02	.024
Ammonium Acetate, kgs .. lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b.						
wks ... 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls .. lb.	.16	.17	.16	.17	.15	.17
carbonate, tech, 500 lb						
bbls ... lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb						
bbls, wks ... 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks						
... 100 lb.	5.00	5.75	5.00	5.75	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Linoleate ... lb.	.11	.12	.11	.12	.11	.12
Nitrate, tech, cks ... lb.	.04	nom.	.04	nom.	.04	.05
Oleate, drs ... lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd,						
bbls ... lb.	...	.23	...	.23	.26	.27
pure, cryst, bbls, kgs .. lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs ... lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs .. lb.	.21	.24	.21	.24	.21	.25
Phosphate, dibasic tech,						
powd, 325 lb bbls ... lb.	.07½	.10	.07½	.10	.07½	.10
Sulfate, dom, f.o.b., bulk ton	...	27.00	26.00	27.00	22.00	26.00
200 lb bgs ... ton	...	nom.	...	nom.	...	nom.
100 lb bgs	...	nom.	...	nom.	...	nom.
Sulfocyanide, kgs ... lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane)						
tks, delv ... lb.	...	.11½	...	.11½	.11½	.13½
tech, drs, delv ... lb.	.12½	.13½	.12½	.13½	.12½	.149
Secondary, tks, delv .. lb.	...	.08½	...	.08½	...	.108
c-l, drs, delv ... lb.	...	.09½	...	.09½	.118	.123
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ... lb.	.07	.077	.07	.077	.07	.077
tks, wks ... lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks ... lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ... lb.	...	.25	...	.25	...	...
Stearate, lcl, wks, drs .. lb.	...	.26	...	.26	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks ... lb.	.102	.11	.102	.11	.102	.11
tks, wks ... lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and						
tks ... lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine ... lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ... lb.	...	.75	...	.75	...	.75
40% ... lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125						
lb bbls ... lb.	...	.65	.50	.65	.50	.52
Antimony metal slabs, ton						
lots ... lb.	.14¼	.15¼	.13⅝	.15¼	.11⅜	.14
Butter of, see Chloride.						
Chloride, soln cbys ... lb.	...	.17	...	.17	.13	.17
Needle, powd, bbls ... lb.	.14	.16	.14	.16	.11	.12½
Oxide, 500 lb bbls ... lb.	...	.14¼	...	.14¼	.12¾	.14
Salt, 63% to 65%, tins .. lb.	.22	.24	.22	.24	.22	.24
Sulfuret, golden, bbls ... lb.	.22	.23	.22	.23	.22	.23
Vermilion, bbls ... lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls .. lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ... lb.	.18	.20	.18	.20	.18	.20
Argols, 80%, casks ... lb.	.14	.15	.14	.15	.14	.15
Crude, 30%, casks ... lb.	.07	.08	.07	.08	.07	.08
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ... lb.	.08¾	.09¾	.08¾	.09¾	.08¾	.09¾
Arsenic, Metal ... lb.	.42	.44	.42	.44	.40	.44
Red, 224 lb cs kgs ... lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs ... lb.	.03	.04	.03	.04	.03	.04½
Asbestine, c-l, wks ... ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip,						
200 lb bgs, wks ... ton	52.50	62.50	52.50	62.50	56.50	61.00
Nat (witherite) 90% gr,						
c-l, wks, bgs ... ton	42.00	45.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY lb.	.16½	.17½	.16½	.17½	.15½	.17½
Chloride, 600 lb bbl, wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls ... lb.	.04¾	.05½	.04¾	.05½	.05¼	.06
Nitrate, bbls ... lb.	...	.07	...	.07	.07	.08¼
Barytes, floated, 350 lb bbls						
wks ... ton	23.65	31.15	23.65	31.15	23.65	31.15
Bauxite, bulk, mines ... ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs,						
wks ... ton	...	16.00	...	16.00	...	16.50
No. 2 ... ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb						
drs, wks ... lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind,						
8000 gal tks, frt allowed						
... gal.	...	.16	...	.16	.16	.18
90% c-l, drs ... gal.	...	.23	...	.23	...	.23
Ind pure, tks, frt allowed						
... gal.	...	.16	...	.16	.16	.18
Benzidine Base, dry, 250 lb						
bbls ... lb.	.70	.72	.70	.72	.70	.74
Benzoyl Chloride, 500 lb						
drs ... lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs .. lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl,						
wks ... lb.	.23	.24	.23	.24	.24	.27
Naphthylamine, sublimed,						
200 lb bbls ... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.51	.52	.51	.52	.51	.55
Bismuth metal ... lb.	1.00	1.10	1.00	1.10	1.00	1.10
Chloride, boxes ... lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ... lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes ... lb.	2.75	3.00	2.75	3.00	2.95	3.00
Subbenzoate, boxes ... lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs ... lb.	1.40	1.45	1.40	1.45	1.40	1.45
Trioxide, powd, boxes ... lb.	3.45	3.50	3.45	3.50	3.45	3.50
Subnitrate ... lb.	1.30	1.35	1.30	1.35	1.30	1.35
Blackstrap, cane (see Molasses,						
Blackstrap).						
Blanc Fixe, 400 lb bbls,						
wks ... ton *h*	40.00	75.00	40.00	75.00	42.50	70.00
Bleaching Powder, 800 lb drs,						
c-l, wks, contract .. 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks ... lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY .. unit	...	4.30	4.25	4.30	2.50	4.25
Chicago, high grade ... unit	...	4.65	4.60	4.65	2.90	4.50
Imported shipt ... unit	...	4.10	4.05	4.10	2.60	3.75
Blues, Bronze Chinese Milori						
Prussian Soluble ... lb.	.36	.37	.36	.37	.37	.38½
Ultramarine,* dry, wks,						
bbls ... lb.	...	.10	...	.10	...	.10
Regular grade, group 1 lb.	...	.15	...	.15	...	.15
Special, group 1 ... lb.	...	.18	...	.18	...	.18
Pulp, No. 1 ... lb.	...	.26	...	.26	...	.26
Bone, 4½ + 50% raw,						
Chicago ... ton	...	28.00	26.00	28.00	20.00	25.00
Bone Ash, 100 lb kgs ... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ... lb.	.05½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	26.25	25.00	26.25	23.00	26.00
Domestic, bgs, Chicago ton	...	23.00	19.00	23.00	16.00	20.00
Borax, tech, gran, 80 ton lots,						
sacks, delv ... ton *i*	...	40.00	...	40.00	...	40.00
bbls, delv ... ton *i*	...	50.00	...	50.00	...	50.00
c-l, sacks, delv ... ton *i*	...	44.00	...	44.00	...	44.00
c-l, bbls, delv ... ton *i*	...	54.00	...	54.00	...	54.00
Tech, powd, 80 ton lots,						
sacks ... ton *i*	...	45.00	...	45.00	...	45.00
bbls, delv ... ton *i*	...	56.00	...	56.00	...	56.00
c-l, sacks, delv ... ton *i*	...	49.00	...	49.00	...	49.00
c-l, bbls, delv ... ton *i*	...	59.00	...	59.00	...	59.00
Bordeaux Mixture, consumers,						
East, c-l, tins, drs, cases lb.	.10½	.11	.10½	.11	.08	.16
Dealers, East, c-l ... lb.	.10	.10½	.10	.10½	.08½	.16½

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Bromine, cases ....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk ....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks ....lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed .... lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed ... lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed ....lb.	...	.07½	...	.07½	.07½	.096
drs, frt, allowed ... lb.	.08½	.09	.08½	.09	.106	.111
Aldehyde, 50 gal drs, wks ....lb.	.19	.21	.19	.21	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate ....lb.	.22½	.23½	.22½	.23½	.22½	.23½
Propionate, drs ....lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ....lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ... lb.	...	.26	...	.26	..	.26
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	..	.
Cadmium Metal ....lb.	...	1.05	...	1.05	.75	1.05
Sulfide, boxes ....lb.	.90	1.00	.90	1.00	.90	1.10
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	2.10	...	2.10	...	2.10
Arsenate, jobbers, East of Rocky Mts, drs ......lb.	.06	.06⅜	.06	.06⅜	.06	.06⅜
dealers, drs ....lb.	.06¼	.07¾	.06¼	.07¾	.06¼	.07¾
South, jobbers, drs ... lb.	.06	.06½	.06	.06½	.06	.06½
dealers, drs ....lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
Carbide, drs ....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv ....ton	...	22.00	...	22.00	...	22.00
Solid, 650 lb drs, c-l, delv ....ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks ....lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls ....lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs ....ton	.	26.10	...	26.10	...	26.50
Palmitate, bbls ....lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls ....lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs ....lb.	...	.55	...	.55	.50	.56
Powder ....lb.	...	.55	...	.55	.4940	.56
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05¼	.08
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv ......lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv ....lb.	.	.08¼	.	.08¼	...	.08¼
Decolorizing, drs, c-l ...lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv ....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.19½	.20¾	.19½	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs ... lb.	.20	.21¼	.20	.21¼	.15	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	...	23.00	...	23.00	15.00	20.00
Imported, ship, bgs ....ton	.	nom.	...	nom.	17.00	18.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.17	.18
Transparent, cs ....lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs ....lb.	.	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks ......lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	.	.15
Softwood, bgs, delv* ....ton	27.00	30.40	27.00	30.40	24.40	30.40
Willow, powd, 100 lb bbl, wks ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
Chestnut, clarified bbls, wks lb.	...	.01625	...	.01625	.01625	.01⅞
25%, tks, wks ....lb.	...	.02	...	.02	.01½	.02
Pwd, 60%, 100 lb bgs, wks ....lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	6.50	...	6.50	...	7.00
Imported, lump, blk ...ton	22.00	25.00	22.00	25.00	15.00	25 00
Chlorine, cyls, lcl, wks, contract ....lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont ....lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks ....lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks ....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ....lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ....lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls ..lb.	...	.80	...	.80	.85	.90
Chrome, Green, CP ......lb.	.20	.23	.20	.23	.21½	.23
Yellow ....lb.	.13	.14	.13	.14	.11	.14
Chromium, Acetate, 8% Chrome, bbls ....lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls ...lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

Current

Coal Tar
Diphenylguanidine

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls ....bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls ....lb.	.58	.60	.58	.60	.58	.60
Carbonate tech, bbls ....lb.	1.42¾	1.48	1.42¾	1.48	1.35	1.48
Hydrate, bbls ....lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls ...lb.	...	.31¼	...	.31¼	.30	.31¼
Oxide, black, bgs ....lb.	1.41	1.51	1.41	1.51	1.29	1.49
Resinate, fused, bbls ...lb.	...	.13	...	.13	.12½	.13
Precipitated, bbls ....lb.	...	.30½	...	.30½	.	.32
Cochineal, gray or bk bgs..lb.	.32	.36	.32	.36	.32	.36
Teneriffe silver, bgs ....lb.	.33	.37	.33	.37	.33	.37
Copper, metal, electrol 100 lb.	.	13.00	...	13.00	9.50	12.00
Carbonate, 400 lb bbls ..lb.	.11½	.12½	.11½	.12½	...	.08¼
52-54% bbls ....lb.	.16¼	.17¼	.16¼	.17¼	.14½	.16¼
Chloride, 250 lb bbls ...lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls ....lb.	...	.20	.	.20	.	.20
Oxide, black, bbls, wks..lb.	.17½	.18	.17½	.18	.14½	.15¾
red 100 lb bbls ....lb.	.17	.18	.17	.18	.14	.15
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls ...lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	.	4.85	4.55	4.85	3.85	4.55
Copperas, crys and sugar bulk c-l, wks ....ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.	3.74	3.84	3.74	3.84	3.08	4.03
Corn Syrup, 42°, bbls..100 lb.	...	3.76	3.76	3.80	3.05	3.95
43°, bbls ....100 lb.	...	3.86	3.86	3.88	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls ....lb.	...	.15	...	.15	.15	.16¾
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ....gal.	.13	.13½	.13	.13½	.12½	.13½
Grade 2 ....gal.	.113	.12½	.113	.12½	.109	.12
Cresol, USP, drs ....lb.	.10	.10½	.10	.10½	.10	.10½
Crotonaldehyde, 98%, drs, wks ....lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.12½	1.10	1.12½	1.07½	1.10
Derris root 5% rotenone, bbls ....lb.	.39	.47	.39	.47	...	...
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	4.35	4.55	4.35	4.55	3.45	5.00
British Gum, bgs ...100 lb.	4.60	4.80	4.60	4.80	3.70	5.40
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ...lb.	...	.08	...	.08	...	.08
White, 140 lb bgs ..100 lb.	4.30	4.58	4.30	4.58	3.40	4.95
Diamylamine, drs, wks ...lb.	.	.75	.	.75	.75	1.00
Diamylene, drs, wks ....lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	.	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ..lb.	...	.30	...	.30	...	.
Diamylphthalate, drs, wks lb.	.19	.19½	.19	.19½	.18	.19½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls ....lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutyl Ether, drs, wks, lcl lb.	...	.22	...	.22	...	...
Dibutylphthalate, drs, wks, frt allowed ....lb.	.19½	.20	.19½	.20	.18	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs ....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs wks ....lb.	.15	.16	.15	.16	.16	.17
tks, wks ....lb.	...	.14	...	.14	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		.032	.040
tks, wks ....lb.	no prices		no prices		...	.02½
Diethanolamine, tks, wks..lb.	.31	.35	.31	.35	.	.30
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs..lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs ....lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.18	.18½	.18	.18½	.18	.19
Diethylsulfate, tech, drs, wks, lcl ....lb.	...	.20	...	.20	...	.20
Diethyleneglycol, drs ....lb.	.16½	.17½	.16½	.17½	.15½	.17½
Mono ethyl ethers, drs..lb.	.16	.17	.16	.17	.15	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls ....lb.	...	.24	...	.24	...	.24
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	.95	...	.95	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs lb	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed ....lb.	.20½	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls ....lb.	.16	.17	.16	.17	.14	.15½
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.14½	.15½	.14½	.15½	.14½	.16½
Diphenyl, bbls ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.35	.37

k Higher price is for purified material.

	Current Market		1937		1936	
			Low	High	Low	High
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	34 00	nom.	34.00	nom.	32.00	45.00
Extract lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases lb.	.68	nom.	.68	nom.	.63	.68
Imported lb.	.53	.56	.53	.56	.48	.56
Epsom Salt, tech, 300 lb bbls c-l NY 100 lb.	1.80	2.00	1.80	2.00	1.80	2.00
USP, c-l, bbls 100 lb.	...	2.00	...	2.00	...	2.00
Ether, USP anaesthesia 55 lb drs lb.	.22	.23	.22	.23	.22	.23
(Conc) lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed lb.	...	.06	...	.06	.	.06
Nitrous, conc, bottles lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks, frt alld lb.	...	.06½	...	.06½	.06½	.08
drs, frt alld lb.	...	.07½	...	.07½	.07½	.09
Anhydrous, tks, frt alld lb.	...	.07½	...	.07½	.07	.08½
drs, frt alld lb.	...	.08½	...	.08½	.08	.10
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys lb.	...	.30	...	.30	...	.30
Crotonate, drs lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks lb.	...	.33	...	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont lb.	.75	.85	.75	.85	.75	.85
Anhydrous lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.21
tks, wks lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks lb.	.20	.21	.20	.21	.20	.21
tks, wks lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks lb.	.16	.17	.16	.17	.16	.17
tks, wks lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks lb.	...	.14	...	.14	.14	.18½
tks, wks lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks lb.	.18	.22	.18	.22	.19	.23
tks, wks lb.	...	.17	...	.17	...	.18
Oxide, cyl lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ton	...	14.50	...	14.50	.	14.50
Powd, blk, wks ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks unit *l*	...	nom.	...	nom.	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis unit *m*	...	nom.	...	nom.	.	2.25
Fluorspar, 98%, bgs lb.	no prices		no prices		30 00	35.50
Formaldehyde, USP, 400 lb bbls, wks lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes lb.	.16	.18	.16	.18	.16	.18
G SALT PASTE						
G Salt paste, 360 lb bbls lb.	.45	.47	.45	.47	.45	.47
Gall Extract lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs 100 lb.	.09½	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks* 100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.						
Glue, bone, com grades, c-l bgs lb.	.11	.17½	.11	.17½	.10½	.17½
Better grades, c-l, bgs lb.	.12½	.17½	.12½	.17½	.12	.17½
Casein, kgs lb.	.18	.22	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

Current

Glycerin
Gum, Hemlock

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs	lb.	...	nom.	...	nom.	.16	.21½
Dynamite, 100 lb drs	lb.	...	nom.	...	nom.	.13¾	.21½
Saponification, drs	lb.	...	nom.	...	nom.	.10¼	.22
Soap Lye, drs	lb.	...	nom.	...	nom.	.09¼	.20
Glyceryl Phthalate	lb.	...	.29	...	.29	.28	.29
Glyceryl Stearate, bbls	lb.	...	.18	...	.18		.18
Glycol Phthalate, drs	lb.	...	.29	...	.29	.29	.35
Glycol Stearate, drs	lb.	...	.23	...	.23	...	.23
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.10½	.11	.10½	.11	.09	.10¾
White sorts, No. 1, bgs	lb.	.27	.28	.27	.28	.25	.28
No. 2, bgs	lb.	.25	.26	.25	.26	.24	.26
Powd, bbls	lb.	.14	.15	.14	.15	.13	.14
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.18	.19	.18	.19	.15	.19
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.18⅞	...	.18⅞	.18½	.20
Dark amber	lb.	...	.06⅞	...	.06⅞	.06⅞	.08
Light amber	lb.	...	.10¼	...	.10¼	.10¼	.14⅛
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.13	...	.13	.12⅝	.14
Chips	lb.	...	.06½	...	.06½	.06⅛	.06½
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.11¼	...	.11¼	.10⅜	.11⅛
Singapore							
Bold	lb.	...	.15⅝	...	.15⅝	.15⅛	.16⅞
Chips	lb.	...	.05	...	.05	.04⅜	.05¼
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10¾	...	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A	lb.	...	.09¾	...	.09¾	.09¼	.13
Loba B	lb.	...	.09¼	...	.09¼	.08⅞	.12
Loba C	lb.	...	.08⅞	...	.08⅞	.08⅜	.11⅛
DBB	lb.	...	.08	...	.08	.07⅝	.08⅞
Dust	lb.	...	.05¾	...	.05¾	.05	.06⅛
MA sorts	lb.	...	.06¾	...	.06¾	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.15½	...	.15½	.14¼	.16
Chips	lb.	...	.09⅛	...	.09⅛	.07	.08½
Mixed	lb.	...	.13½	...	.13½	.13¼	.13¾
Nubs	lb.	...	.12¾	...	.12¾	.10¼	.12
Split	lb.	...	.13½	...	.13½	.12¾	.13
Dammar Batavia, 136 lb cases							
A	lb.	...	.23½	...	.23½	.21⅜	.22¼
B	lb.	...	.22⅛	...	.22⅛	.20⅜	.21½
C	lb.	...	.18½	...	.18½	.16½	.17⅝
D	lb.	...	.15⅝	...	.15⅝	.13⅝	.14⅜
A/D	lb.	...	.18½	...	.18½	.15½	.17⅛
A/E	lb.	...	.15¼	...	.15¼	.12⅞	.14½
E	lb.	...	.07½	...	.07½	.06¾	.07⅛
F	lb.	...	.06¼	...	.06¼	.05⅞	.06⅞
Singapore							
No. 1	lb.	...	.17⅛	...	.17⅛	.16¼	.17½
No. 2	lb.	...	.14⅛	...	.14⅛	.13	.14¼
No. 3	lb.	...	.05¾	...	.05¾	.05¼	.05¾
Chips	lb.	...	.10¼	...	.10¼	.09¾	.09¾
Dust	lb.	...	.05¾	...	.05¾	.04¼	.05⅝
Seeds	lb.	...	.07⅞	...	.07⅞	.06⅝	.07⅜
Elemi, cons	lb.	.09¾	.10¼	.09¾	.10¼	.09¾	.10¼
Ester	lb.	.11½	.12	.11½	.12	.07⅝	.10
Gamboge, pipe, cases	lb.	.58	.59	.58	.59	.58	.59
Powd, bbls	lb.	.65	.66	.65	.66	.65	.66
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx	lb.	.24	.25	.24	.25	.24	.25
xx	lb.	.16	.17	.16	.17	.16	.17
No. 1	lb.	.09½	.10	.09½	.10	.09½	.10
No. 2	lb.	.08½	.09	.08½	.09	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	.33	.33½	.33	.33½	.33	.33½
B1	lb.	...	.21	...	.21	.19	.21
B2	lb.	...	.15½	...	.15½	.14½	.15½
B3	lb.	.12	.12½	.12	.12½	.12	.12½
Pale XXX	lb.	.65	.65½	.65	.65½	.65	.65½
No. 1	lb.	.40	.40½	.40	.40½	.40	.40½
No. 2	lb.	.22	.22½	.22	.22½	.22	.22½
No. 3	lb.	.15	.15½	.15	.15½	.15	.15½
Kino, tins	lb.	.70	.80	.70	.80	.70	.80
Mastic	lb.	.57	.58	.57	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.33	.35	.33	.35	.19½	.38
Senegal, picked bgs	lb.	.20	.21	.20	.21	.20	.21
Sorts	lb.	.09¾	.10¼	.09¾	.10¼	.09¾	.12½
Thus, bbls	280 lbs.	...	12.00	...	12.00	11.00	12.00
Strained	280 lbs.	...	12.00	...	12.00	11.00	12.00
Tragacanth, No. 1, cases	lb.	2.40	2.50	2.40	2.50	1.20	2.50
No. 2	lb.	2.00	2.10	2.00	2.10	1.10	2.10
No. 3	lb.	1.95	2.05	1.95	2.05	.95	2.05
No. 4	lb.	1.85	1.95	1.85	1.95	.85	1.95
No. 5	lb.	1.65	1.75	1.65	1.75	.75	1.75
Yacca, bgs	lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.03¾
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.16	.18	.16	.18	.16	.18
Hemlock, 25%, 600 lb bbls, wks	lb.	...	.03⅛	...	.03⅛	...	.02⅞
tks	lb.	...	.02¾	...	.02¾	...	.02½

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks .... gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs .... lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, delv, drs .. lb.	...	.10	...	.10	.10	.12½
tks .... lb.	...	.09	...	.09	.09	.11½
Hoof Meal, f.o.b. Chicago unit	...	3.50	...	3.50	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys .... lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride .... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.15	.20	.15	.20	.17	.20
INDIGO						
Indigo, Bengal, bbls ...... lb.	...	2.40	...	2.40	...	...
Synthetic, liquid .... lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs ... lb.	1.50	1.55	1.50	1.55	1.50	1.75
Irish Moss, ord, bales .... lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales .. lb.	.20	.21	.20	.21	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls . 100 lb.	2.75	3.25	2.75	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks .... lb.	.33	.34	.33	.34	.33	.34
tks, wks .... lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed .... lb.	...	.06½	...	.06½	.06	.07½
drs, frt allowed .... lb.	.07½	.08	.07½	.08	.07	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown .... ton	60.00	70.00	60.00	70.00	60.00	70.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls,						
White, broken .... lb.	...	.11½	...	.11½	.11	.11½
cryst, bbls .... lb.	...	.11½	...	.11½	.10½	.11½
gran, bbls .... lb.	...	.12¼	...	.12¼	.11	.12¼
powd, bbls .... lb.	...	.12¼	...	.12¼	.11¼	.12¼
Arsenate, East, drs ..... lb.	...	.11	...	.11	.09	.10
Dealers, drs .... lb.	...	.10½	...	.10½	.09¼	.10¾
West, drs .... lb.	...	.11	...	.11	.09	.09¾
Dealers, drs ..... lb.	...	.10½	...	.10½	.09½	.10
Linoleate, solid, bbls ... lb.	...	.18	...	.18	.18	.26½
Metal, c-l, NY ..... 100 lb.	...	6.00	...	6.00	4.50	6.00
Nitrate, 500 lb bbls, wks lb.	.09	.09½	.09	.09½	.09	.09½
Oleate, bbls .... lb.	.15	.16	.15	.16	.15	.16
Red, dry, 95% Pb_2O_4, delv .... lb.	...	.085	...	.085	.07	.085
97% Pb_2O_4, delv ..... lb.	...	.08¾	...	.08¾	.07¼	.08¾
98% Pb_2O_4, delv ..... lb.	...	.09	...	.09	.07½	.09
Resinate, precip, bbls ... lb.	...	.14	...	.14	...	.14
Stearate, bbls .... lb.	.22	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b. wks, frt allowed ..... lb.	...	.10	...	.10	...	...
White, 500 lb bbls, wks .. lb.	...	.07¼	...	.07¼	.06½	.07¼
Basic sulfate, 500 lb bbls, wks .... lb.	...	.06¾	...	.06¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk ..... ton	6.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks .. ton	8.00	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks .. gal.	...	.11	...	.11	...	.11
drs .... gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs .... ton	...	42.50	...	42.50	29.00	40.50
Litharge, coml, delv, bbls .. lb.	...	.075	...	.075	.06	.075
Lithopone, dom, ordinary, delv, bgs .... lb.	.04¼	.04½	.04¼	.04½	.04¼	.04¾
bbls .... lb.	.04½	.04¾	.04½	.04¾	.04½	.05
High strength, bgs ..... lb.	.05¾	.06	.05¾	.06	.05¾	.06¼
bbls .... lb.	.06	.06¼	.06	.06¼	.06	.06½
Titanated, bgs .... lb.	.05¾	.06	.05¾	.06	.05¾	.06¼
bbls .... lb.	.06	.06¼	.06	.06¼	.06	.06½
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.10½	.06½	.10½
Solid, 50 lb boxes ..... lb.	.13½	.17½	.13½	.17½	.13½	.17½
Sticks .... ton	24.00	25.00	24.00	25.00	24.00	26.00
MADDER						
Madder, Dutch .... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks .... lb.	.06	.06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks .... ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks .... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls .... lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls ... lb.	...	.50	...	.50	...	.50
Palmitate, bbls .... lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls ..... lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls .... lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs ... lb.	.25½	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ... lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l .... ton	...	47.50	...	47.50	...	47.50
Hydrate, bbls .... lb.	...	.80	...	.80	...	...
Linoleate, liq, drs ...... lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls .... lb.	.17½	.19	.17½	.19	...	...
Resinate, fused, bbls .... lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs .... lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs ..... lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African .... ton	26.00	27.00	26.00	27.00	25.50	27.00

Current

Mannitol
Orthodichlorobenzene

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks ....lb.	...	1.48	...	1.48	1.48	1.60
Marble Flour, blk ....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride ....lb.	...	1.20	...	1.20	.81	1.20
Mercury metal ...76 lb. flasks	93.00	95.00	93.00	95.00	73.50	95.00
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls ....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls ....lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd ....gal.	...	.53	...	.53	...	...
contracts ....gal.	...	.50	...	.50	...	...
tanks, frt all'd ......gal.	...	.48	...	.48	...	...
contracts, frt all'd ..gal.	...	.45	...	.45	...	...
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	...
tanks ....gal.	...	.33	...	.33	...	...
95%, tks ....gal.	...	.31	...	.31	...	...
97%, tks ....gal.	...	.32	...	.32	...	...
Methyl Acetate, dom, 98-100%, drs ....lb.	.16	.17½	.16	.17½	.11	.18½
Acetone, frt allowed, drs ....gal. *p*	.45½	.58½	.45½	.58½	.45½	.68½
tks, frt allowed, drs gal. *p*	.41	.44½	.41	.44½	.41	.48
Synthetic, frt all'd, east of Rock M., drs ....gal. *p*	.52½	.59½	.52½	.59½	.52½	.60
tks, frt all'd ....gal.	.48	.49½	.48	.49½	.48	.53
West of Rocky M., frt all'd, drs ..gal. *p*	.55½	.58	.55½	.58	.55½	.69
tks, frt all'd ..gal. *p*	...	.51	...	.51	.51	.63½
Anthraquinone ....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl .....lb.	.37	.43	.37	.43	...	.45
Ethyl Ketone, tks ......lb.	...	.07½	...	.07½	...	.07½
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY ....gal.	...	.07¼	...	.07¼	.07	.08¼
Monoamylamine, drs, wks lb.	...	1.00	...	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.30	...	.30	...	.30
Monomethylparaminosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls ..lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs ....ton	...	28.00	...	28.00	22.00	26.50
J2 bgs ....ton	...	20.75	...	20.75	14.25	16.75
R2 bgs ....ton	...	20.25	...	20.25	14.00	16.25
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.31	...	.31	...	.31
drs, c-l ....gal.	...	.36	...	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks ....lb.	2.85	3.00	2.85	3.00	2.75	4.50
Imported, cif, bgs ....lb.	2.85	3.00	2.85	3.00	...	...
Balls, flakes, pks ......lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks ..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Dyestuffs, bgs, bbls, wks lb.	...	.07¼	...	.07¼	.06	.07
Flakes, ref'd, bbls, wks ..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls ....lb.	...	.36	...	.36	...	.36
Chloride, bbls ....lb.	.18	.19	.18	.19	.18	.19
Metal ingot ....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY ..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ....lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk ....ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks ....lb.	.08	.10	.08	.10	.08	.11
tks ....lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.26	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp unit	no prices		no prices		2.00	3.10
dom, Eastern wks ....unit	...	3.60	...	3.60	1.90	3.00
dom, Western wks ....unit	...	3.50	...	3.50	1.85	2.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs .....lb.	.20	.22	.20	.22	.16	.18
Chinese, bgs ....lb.	.20	.22	.20	.22	.19	.20
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03⅛	...	.03⅛	...	.03½
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY ....lb.	...	.11¼	...	.11¼	.10	.11¼
Orthoaminophenol, 50 lb kgs .lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs ....lb.	.35	.75	.35	.75	.50	.65
Orthocresol, drs, wks .....lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs ....lb.	.05	.06	.05	.06	.05	.11½

o Country is divded in 4 zones, prices varying by zone; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthonitrochlorobenzene, 1200 lb drs, wks ... lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins ... lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs ... lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks ... lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ... lb.	.14	.15	.14	.15	.14	.15
Osage Orange, cryst, bbls lb.	.17	.25	.17	.25	.17	.25
51° liquid ... lb.	.07	.08	.07	.08	.07	.07¾
Paraffin, rfd, 200 lb cs slabs						
122-127° M P ... lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P ... lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P ... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs ... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	.	1.05
Chlorophenol, drs ... lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks ... lb.	.16	.20	.16	.20	.16	.20
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls ... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks ... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls ... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l ... lb.	...	.26	...	.26	.26	.50
Phenylenedamine, 350 lb bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ... lb.	.70	.75	.70	.75	.70	.75
tks, wks ... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ... lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealer, drs, frt E. of Cleveland ... lb.	.22	.24	.22	.24	...	.24
Pentane, normal, 28-38° C, group 3, tks ... gal.	...	.09½	.	.09½	.09	.09½
drs, group 3 ... gal.	.12½	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed ... lb.	...	.10½	...	.10½	.10½	.15
Petrolatum, dark amber, bbls ... lb.	.02⅝	.02⅞	.02⅝	.02⅞	.02⅝	.02⅞
Light, bbls ... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls ... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ... lb.	.02⅛	.02⅝	.02⅛	.02⅝	.02⅛	.02⅝
White, lily, bbls ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls ... lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks ... gal.	...	.13	...	.13	...	.13
drs, group 3 ... gal.	.15	.16	.15	.16	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Cleaners naphthas, group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Bayonne, tks, wks ... gal.	...	.09½	...	.09½	.09	.09½
West Coast, tks ... gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ... gal.	...	.16	...	.16	.15	.16
No. 2, tks ... gal.	...	.18	...	.18	...	.18
No. 3, tks ... gal.	...	.16	...	.16	...	.15
No. 4, tks ... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks						
Bayonne ... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ... gal.	.08⅜	.08½	.08⅜	.08½	.07⅞	.08½
Naphtha, V.M.P., East, tks, wks ... gal.	...	.10	...	.10	.09	.10
Group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Petroleum thinner, East, tks, wks ... gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.06⅝	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks ... gal.	...	.09½	...	.09½	.09	.09½
Group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Stoddard Solvent, East, tks, wks ... gal.	...	.09½	.	.09½	.09	.09½
Group 3, tks, wks ... gal.	.06⅞	.07	.06⅞	.07	.06⅞	.07
Phenol, 250-100 lb drs ... lb.	.13¼	.15	.13¼	.15	.13¼	.15
tks, wks ... lb.	...	.12¾	...	.12¾	...	...
Phenyl-Alpha-Naphthylamine, 100 lb kgs ... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ... lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride, com ... lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins ... lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ... lb.	20.00	22.00	20.00	22.00	20.00	22.00

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f o.b. mines						
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis .... ton	...	2.35	...	2.35	...	2.35
72% basis .... ton	...	2.85	...	2.85	...	2.85
75-74% basis ...... ton	...	3.85	...	3.85	...	3.85
75% basis .... ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis . ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175						
lb cyl .... lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ...... lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs . . lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl .... lb.	.16	.20	.16	.20	.16	.20
Yellow, 110 lb cs, wks . . lb.	.28	.33	.28	.33	.28	.33
Phthalic Anhydride, 100 lb						
drs, wks .... lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist .... lb.	.49	.50	.49	.50	.44	.50
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks .... gal.	...	.59	...	.59	...	.59
Straw color, bbls ...... gal.	...	.59	...	.59	...	.59
tks .... gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks .... ton	...	15.00	...	15.00	...	15.00
Coaltar, bbls, wks ..... ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks lb.	...	.03½	...	.03½	...	.03½
Imported .... lb.	.11	.13	.11	.13	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls .... bbl.	6.00	6.50	6.00	6.50	4.00	5.25
Stearin, drs .... lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd .... oz.	...	68.00	45.00	68.00	34.50	64.00

POTASH

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Potash, Caustic, wks, sol . . lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake .... lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks .... lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported						
20% basis, blk ...... ton	...	12.00	...	12.00	11.00	12.00
30% basis, blk ..... unit	...	.55	...	...	...	...
Potassium Acetate .... lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb						
bbls .... lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb						
cks* .... lb.	.08½	.09	.08½	.09	.08½	.09
Binoxalate, 300 lb bbls . . lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ... lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800						
lb cks .... lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks .... lb.	.	.02¾	...	.02¾	.02¾	.02⅞
drs, wks .... lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs,						
wks .... lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs .... lb.	.12	.13	.12	.13	.12	.13
powd, kgs .... lb.	.08½	.08¾	.08½	.08¾	.08	.08¼
Chloride, crys, bbls .... lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs .... lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases . . lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ...... lb.	1.10	1.15	1.10	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	...	.15	...	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.50	...	.50	.45	.50
Oxalate, bbls .... lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks ... lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys,						
500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls ..... lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls .... lb.	.16	.18	.16	.18	.16	.19
Sulfate, 90% basis, bgs ton	.	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb						
bbls .... lb.	.33	.35	.33	.35	.32	.35
Pot & Mag Sulfate, 48% basis						
bgs .... ton		24.75	..	24.75	22.25	24.75
Propane, group 3, tks .... lb.	.03	.04⅜	.03	.04⅜	.03	.04⅜
Putty, coml, tubs ..... 100 lb.	...	3.00	...	3.00	2.75	3.00
Linseed Oil, kgs ... 100 lb.	...	4.75	...	4.75	4.50	4.75
Pyrethrum, conc liq:						
2.4% pyretherins, drs, frt						
allowed .... gal.	...	4.15	...	4.15	...	...
3.6% pyretherins, drs, frt						
allowed .... gal.	...	6.10	...	6.10	...	. .
Flowers, coarse, Japan,						
bgs .... lb.	.	.12¾	...	.12¾	...	...
Fine powd, bbls ...... lb.	.14	.16	.14	.16	...	.
Pyridine, denat, 50 gal drs gal.	...	1.30	...	1.30	...	1.30
Pyrites, Spanish cif Atlantic						
ports, blk .... unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks ... lb.	...	.02⅞	...	.02⅞	.02⅝	.02⅞
450 lb bbls, c-l .... lb.	...	.03¾	...	.03¾	.03⅛	.03¾
Solid, 63%, 100 lb bales						
cif .... lb.	...	.03⅞	...	.03⅞	.03⅝	.03⅞
Clarified, 64%, bales . lb.	...	.04⅜	...	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb						
bbls .... lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs .... lb.	.10	.12	.10	.12	.10	.12

R SALT

	Current Market		1937 Low	1937 High	1936 Low	1936 High
R Salt, 250 lb bbls, wks . . lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans ..... lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ...... lb.	.14½	.15	.14½	.15	.14	.15
Powd, bbls .... lb.	.13½	.14	.13½	.14	.13	.14
Rosin Oil, bbls, first run gal.	.71	.73	.71	.73	.38	.71
Second run .... gal.	.73	.75	.73	.75	.43	.73
Third run, drs .... gal.	.77	.79	.77	.79	.49	.77

* Spot price is ⅛c higher.

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TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Gulf, Newgulf and Long Point, Texas

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	10.00	...	10.00	4.45	10 95
D	...	10.35	...	10.35	4.95	10.95
E	...	10.25	...	10.25	5.15	10.95
F	...	10.80	...	10.80	5 40	10.95
G	...	10.85	...	10.85	5.50	10.95
H	...	10.85	...	10 85	5.60	10.95
I	...	10.90	...	10.90	5.70	10.95
K	...	10.90	...	10.90	5.55	10 95
M	...	11.00	...	11.00	5 60	10.95
N	...	11.00	...	11.00	5.70	11.00
WG	...	11.75	...	11.75	5.85	11 00
WW	...	13.75	...	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):						
B	...	8.75	...	8.75	3.15	9.70
D	...	9.00	...	9.00	3.75	9.70
E	...	9.10	...	9 10	3.90	9.70
F	...	9.55	...	9.55	4.10	9.70
G	...	9.60	...	9.60	4.20	9.70
H	...	9.60	...	9.60	4.30	9.70
I	...	9.65	...	9.65	4.35	9.70
K	...	9.65	...	9.65	4.30	9 70
M	...	9.75	...	9.75	4.35	9.70
N	...	9.75	...	9.75	4.45	9.75
WG	...	10.50	...	10.50	4.45	9.75
WW	...	12.50	...	12.50	4.55	10.80
X	...	12.50	...	12 50	4.55	10.80
Rosins, Wood, wks (280 lb unit), wks, FF	...	9.85	...	9.85	4.30	9.80
Rosin, Wood, c-l, FF grade, NY	...	10.72	...	10.72	6.10	10.52
Rotten Stone, bgs mines . . ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls . . . lb.	...	.12	...	...	...	...
Powdered, bbls . . . . lb.	.08½	.10	...	...	...	...
SAGO FLOUR						
Sago Flour, 150 lb bgs . . . lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks . . 100 lb.	...	1.15	...	1.15	1 15	1.30
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks . . . . . . ton	11.00	12 00	11.00	12.00	11.00	13.00
Saltpetre, gran, 450-500 lb bbls . . . . lb.	.06	.064	.06	.064	.059	.06¼
Cryst, bbls . . . . lb.	.07	.074	.07	.074	.069	.08
Powd, bbls . . . . lb.	.07	.074	.07	.074	.069	.07⅞
Satin, White, 550 lb bbls . . lb.	...	.01½	.	.01½		.01½
Schaeffer's Salt, kgs . . . . lb.	.46	.48	.46	.48	.46	.50
Shellac, Bone dry, bbls . . lb. *r*	.21	.22	.21	.22	.17½	26½
Garnet, bgs . . . . lb.	.16	.17	.16	.17	.15	.20
Superfine, bgs . . . . . . lb. *s*	.15	.18½	.15	.18½	.14½	.18½
T. N., bgs . . . . lb. *s*	.14	.14½	.14	.14½	.13½	.16
Silver Nitrate, vials . . . . . oz.	.32⅝	.34⅝	.32⅝	.34⅝	.32 5/16	.34⅞
Slate Flour, bgs, wks . . . . ton	9.00	10 00	9 00	10 00	9.00	10 00
Soda Ash, 58% dense, bgs, c-l, wks . . . . 100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs . . . . 100 lb.	...	1.23	...	1.23	...	1.23
blk . . . . 100 lb.	...	1.05	...	1.05	...	1.05
paper bgs . . . . 100 lb.	...	1.20	...	1.20	...	1.20
bbls . . . . 100 lb.	...	1.50	...	1.50	...	1.50
Caustic, 76% grnd & flake, drs . . . . 100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs . . . . 100 lb.	...	2.60	...	2 60	...	2.60
Liquid sellers, tks . . 100 lb.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs . . . . lb.	...	.08	...	.08	...	.08
Acetate, tech, 450 lb bbls, wks . . . . lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs . . . . lb.	...	.64	.	.64	.	.64
Antimoniate, bbls . . . . . lb.	.13¾	.14½	.13¾	.14½	.12	.14
Arsenate, drs . . . . lb.	.09½	.11½	.09½	.11½	.	.10½
Arsenite, liq, drs . . . . gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs . . . . lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.75	...	1.75	1.75	1.85
Bichromate, 500 lb cks, wks* . . . . lb.	.06½	.07	.06½	.07	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	...	...	...	...
Chlorate, bgs, wks . . . . lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks . . . lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks . . . . lb.	.07½	.08¼	.07½	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks . . . . lb.	.16	.17	.16	.17	.17	.19
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3 00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks . . . . . . 100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide . . . . lb.	1.90	1.95	1.90	1.95	1.90	2.05
Metal, drs, 280 lbs . . . . lb.	...	.19	...	.19	.	.
Metanilate, 150 lb bbls lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks . . . . 100 lb.	...	2.15	...	2.15	2.15	3 00
cryst, bbls, c-l, wks 100 lb.	...	2.75	...	2.75	2.75	3.25
Monohydrate, bbls . . . . . lb.	...	.023	...	.023	...	.023
Naphthenate, drs . . . . . . lb.	...	.09	...	.09	.	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY . . . . ton	...	26.80	...	26.80	24.80	26.80
100 lb bgs . . . . ton	...	27.50	...	27.50	25.50	27.50
Bulk . . . . ton	...	25.50	...	25.50	23.50	25.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ½c higher.

Current

Sodium Nitrite
Terpineol

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb...lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	1.90	...	1.90	1.95	2.30
bgs, wks ....100 lb.	...	1.70	...	1.70	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks ....100 lb.	...	2.05	...	2.05	1.95	2.30
bgs, wks ....100 lb.	...	1.85	...	1.85	1.75	2.10
Picramate, 160 lb kgs ...lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	...	.10	...	.10	.10	.132
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.06½	.07	.06½	.07	.05¼	.07¼
Stannate, 100 lb drs ....lb.	.33	.36	.33	.36	.28½	.37½
Stearate, bbls ....lb.	.20	nom.	.20	nom.	.20	.26
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks ....100 lb. †	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ....lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	.85	.90	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks ....lb.	...	.25	...	.25	...	...
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls ....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks...lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	3.78	3.98	3.78	3.98	2.99	4.30
Powd, 140 lb bgs ...100 lb.	3.88	4.08	3.88	4.08	3.90	4.54
Potato, 200 lb bgs .....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Imp, bgs ....lb.	.05	.06	.05	.06	.05	.06
Rice, 200 lb bbls ......lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs ......lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	.45	...	.45	...	.45	...
te h, bbls, wks ....lb.	.40	...	.40	...	.40	...
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines .. ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs . 100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs ......100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs. wks ....lb.	.02½	.03½	...	...	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks ....lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks ..lb.	.15	.17	.15	.17	.10	.13
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	...	65.00	...	65.00	52.00	60.00
Extract, 42°, bbls ......lb.	...	.05¼	...	.05¼	...	...
Superphosphate, 16% bulk, wks ....ton	8.25	8.32½	8.25	8.32½	...	...
Run of pile ....ton	...	8.00	...	8.00	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit .. ton	...	.70	...	.70	...	...
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY .....unit *u*	...	4.40	...	4.40	2.65	4.25
Ungrd ....unit *u*	...	4.35	...	4.35	2.40	4.25
Fert grade, f.o.b. Chicago ....unit *u*	...	4.00	...	4.00	2.40	4.00
South American cif unit *u*	...	4.25	...	4.25	2.70	3.90
Tapioca Flour, high grade, bgs ....lb.	.03½	.05½	.03½	.05½	.03½	.05½
Tar Acid Oil, 15%, drs ..gal.	.21	.24	.21	.24	.21	.24
25%, drs ....gal.	.24½	.27½	.24½	.27½	.24	.27½
Tar, pine, delv, drs .....gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls..lb.	.24¾	.25	.24¾	.25	.24¾	.25
USP, bbls ....lb.	.30	.30½	.30	.30½	.28	.30½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ....lb.	.13	.14	.13	.14	.13	.14

† Bags 15c lower; *u* + 10; * Bbls. are 20c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	.	.
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.37½	.38	.37½	.38	.35	.39½
Metal, NY lb.	...	.49⅞	...	.49⅞	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.55	.57	.55	.57	.47	.57
Tetrachloride, 100 lb drs, wks lb.	.	.25½	...	.25½	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06	.06¼	.06	.06¼	.05¾	.06½
Calcium Pigment, bbls lb.	.06	.06¼	.06	.06¼	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	.	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	...	.75	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	. .	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	...
Triamylamine, drs, wks lb.	...	1.25	...	1.25	...	1.25
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl Phosphate, tech, drs lb.	.22½	.23	.22½	.23	.19	.26
Triethanolamine, 50 gal drs wks lb.	.26	.30	.26	.30	.26	.30
tks, wks lb.	...	.25	...	.25	...	.25
Triethylene glycol, drs, wks lb.	...	.26	...	...	...	...
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	...	...	...	...
Tripoli, airfloated, bgs, wks ton	25.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.47	...	.47	.40½	.50
Savannah, bbls gal.	...	.42	...	.42	.35½	.45
Jacksonville, bbls gal.	...	.41	...	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	...	.44	...	.44	.38	.47
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	...	1.04	...	1.04	...	.96
Valonia beard, 42%, tannin bgs ton	35.00	46.00	35.00	46.00	46.00	64.50
Cups, 32% tannin, bgs ton	...	36.00	...	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.65	...	3.65	3.65	3.75
Ex-guaiacol lb.	. .	3.55	.	3.55	3.55	3.65
Vermillion, English, kgs lb.	1.72	1.82	1.72	1.82	1.52	1.85
Wattle Bark, bgs ton	31.00	32.00	31.00	32.00	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.03⅝	...	.03⅝	...	.03⅝

WAXES

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Wax, Bayberry, bgs lb.	.16½	.17	.16½	.17	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.40	.42	.40	.42	.34	.40
Yellow, African, bgs lb.	.28½	.29	.28½	.29	.24	.27
Brazilian, bgs lb.	.30	.33½	.33	.33½	.25	.29½
Chilean, bgs lb.	.30	.33½	.30	.33½	.25	.29½
Refined, 500 lb slabs, cases lb.	.29½	.32	.29½	.32	.28	.32
Candelilla, bgs lb.	.15½	.16½	.15½	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.45½	.47	.45½	.47	.43½	.48
No. 2, yellow, bgs lb.	.44½	.45	.44½	.45	.42	.46
No. 2, N. C., bgs lb.	.38	.40	.38	.40	.38	.40
No. 3, Chalky, bgs lb.	.34½	.36	.34½	.36	.33½	.38
No. 3, N. C., bgs lb.	.35½	.37	.35½	.37	.34	.41
Ceresin, dom, bgs lb.	.08	.11	.08	.11	.08	.11
Japan, 224 lb cases lb.	.10½	.11	.10½	.11	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¾	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	.	15.00
Gilders, bgs, c-l, wks ton	.	15.00	.	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt allowed gal.	...	.30	...	.30	.	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	no prices		no prices		.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.00	...	2.00	.	2.00
Cyanide, 100 lb drs lb.	.36	.37	.36	.37	.36	.38
Zinc Dust, 500 lb bbls, c-l, delv lb.	...	.0790	...	.0790	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	6.35	...	6.35	.	5.825
E. St. Louis 100 lb.	...	6.00	...	6.00	4.80	5.45
Oxide, Amer, bgs, wks lb.	.05¼	.05½	.05¼	.05½	.05	.05½
French, 300 lb bbls, wks lb.	.05½	.07	.05½	.07	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	.09	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

Current

Zinc Sulfate
Oil, Whale

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl, wks ... lb.	.028	.033	.028	.033	.028	.033
Flake, bbls ... lb.	.032	.035	.032	.035	.032	.035
Sulfide, 500 lb bbls, delv lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv ... lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs ... lb.	.24	.25	.24	.25	.24	.25
Zirconium Oxide, crude, 73-75% grd, bbls, wks ... ton	75.00	100.00	...	...	...	...
kgs, wks ... lb.	.04¼	.04½	...	...	...	...

Oils and Fats

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Castor, No. 3, 400 lb bbls ... lb.	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls ... lb.	.12¼	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	...	.14½	...	.14½	.13	.19¼
Tks, spot NY ... lb.	...	.14¼	...	.14¼	.125	.19
Coast, tks ... lb.	.133	.134	.133	.134	.127	.18
Coconut, edible, bbls NY ... lb.	...	.15	...	.15	.09¼	.14¼
Manila, tks, NY ... lb.	...	.09½	...	.09½	.04⅛	.07
Tks, Pacific Coast ... lb.	...	.08¾	...	.08¾	.03⅞	.08½
Cod, Newfoundland, 50 gal bbls ... gal.	...	.52	...	.52	.40	.48½
Copra, bgs, NY ... lb.	.0550	nom.	.0550	nom.	.0320	.0535
Corn, crude, tks, mills ... lb.	...	.10¾	...	.10¾	.08	.10½
Refd, 375 lb bbls, NY ... lb.	...	.13	...	.13	.10¾	.13
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls. NY ... lb.	.07¾	.08	.07¾	.08	.05¼	.08
English, bbls, NY ... lb.	.07¾	.08	.07¾	.08	.04	.08
Greases, Yellow ... lb.	.08¾	.08⅞	.08¾	.08⅞	.03⅜	.08¼
White, choice bbls, NY ... lb.	.08⅞	.09⅞	.08⅞	.09⅞	.04⅛	.08¾
Herring, Coast, tks ... gal.	...	nom.	...	nom.	...	.31
Lard Oil, edible, prime ... lb.	...	.16¾	...	.16¾	.12¾	.16¼
Extra, bbls ... lb.	...	.13½	...	.13½	.09½	.13
Extra, No. 1, bbls ... lb.	...	.13	...	.13	.07¾	.12¼
Linseed, Raw less than 5 bbl lots ... lb.	.109	.111	.109	.111	.104	.117
bbls, c-l, spot ... lb.	.101	.103	.101	.103	.096	.103
Tks ... lb.	.095	.097	.095	.097	.086	.097
Menhaden, tks, Baltimore gal.	...	.37	...	.37	.25	.36
Refined, alkali, drs ... lb.	...	.09	...	.09	.066	.084
Tks ... lb.	...	.084	...	.084	.062	.078
Kettle bodied, drs ... lb.	...	.10	...	.10	.08	.096
Light pressed, drs ... lb.	...	.084	...	.084	.06	.078
Tks ... lb.	...	.078	...	.078	.056	.072
Neatsfoot, CT. 20°, bbls, NY ... lb.	...	.17½	...	.17½	.16	.17
Extra, bbls, NY ... lb.	...	.13¼	...	.13¼	.08	.12½
Pure, bbls, NY ... lb.	...	.14¼	...	.14¼	.11½	.12¾
Oiticica, bbls ... lb.	.11½	.12	.11½	.12	.10	.15½
Oleo, No. 1, bbls, NY ... lb.	...	.14½	...	.14½	.09¼	.14
No. 2, bbls, NY ... lb.	...	.14	...	.14	.08¾	.13½
Olive, denat, bbls, NY ... gal.	...	1.65	...	1.65	.73	1.60
Edible, bbls, NY ... gal.	2.20	nom.	2.20	nom.	1.60	2.25
Foots, bbls, NY ... lb.	.11½	.11⅝	.11½	.11⅝	.08	.10⅜
Palm, Kernel, bulk ... lb.	...	.08⅛	...	.08⅛	.04¾	.083
Niger, cks ... lb.	.07⅛	.07¼	.07⅛	.07¼	.04	.06½
Sumatra, tks ... lb.	...	.06½	...	.06½	.03¾	.06½
Peanut, crude, bbls, NY ... lb.	...	.10⅝	...	.10⅝	.08	.10½
Tks, f.o.b. mill ... lb.	...	.10¼	...	.10¼	.17¾	.10⅜
Refined, bbls, NY ... lb.	...	.13½	...	.13½	.12	.13¼
Perilla, drs, NY ... lb.	.11½	.11¾	.11½	.11¾	.07	.11¾
Tks, Coast ... lb.	.11	.11¼	.11	.11¼	.066	.11¼
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.13¼	.13½	.13¼	.13½	.086	.13½
Denatured, drs, NY ... gal.	.85	.86	.85	.86	.52	.85
Red, Distilled, bbls ... lb.	.11⅝	.12⅝	.11⅝	.12⅝	.08⅝	.11⅝
Tks ... lb.	...	.10¾	...	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks ... gal.	...	nom.	...	nom.	.31	.32½
Sardine, Pac Coast, tks ... gal.	...	.50	...	.50	.28	.47
Refined alkali, drs ... lb.	...	.09	...	.09	.066	.084
Tks ... lb.	...	.084	...	.084	.062	.078
Light pressed, drs ... lb.	...	.084	...	.084	.06	.078
Tks ... lb.	...	.078	...	.078	.056	.072
Sesame, yellow, dom ... lb.	...	.13¼	...	.13¼	.12¾	.14½
White, dos ... lb.	...	.13¼	...	.13¼	.12¾	.14½
Soy Bean, crude						
Dom, tks, f.o.b. mills ... lb.	...	.10½	...	.10½	.07	.10½
Crude, drs, NY ... lb.	...	.11½	...	.11½	.076	.11½
Ref'd, drs, NY ... lb.	.12	.12½	.12	.12½	.081	.12½
Tks ... lb.	...	.11½	...	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls NY ... lb.	.10	.102	.10	.102	.094	.102
45° CT, bleached, bbls, NY ... lb.	.093	.095	.093	.095	.087	.095
Stearic Acid, double pressed dist bgs ... lb.	.12½	.13½	.12½	.13½	.08½	.12½
Double pressed saponified bgs ... lb.	.12¾	.13¾	.12¾	.13¾	.09	.12¾
Triple pressed dist bgs ... lb.	.15½	.16½	.15½	.16½	.11¼	.15½
Stearine, Oleo, bbls ... lb.	.11	.11½	.11	.11½	.07¼	.12¼
Tallow City, extra loose ... lb.	...	.09⅛	...	.09⅛	.04⅛	.08⅜
Edible, tierces ... lb.	...	.10¼	...	.10¼	.06¾	.09½
Acidless, tks, NY ... lb.	...	.12¾	...	.12¾	.07	.11¾
Turkey Red, single, bbls ... lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls ... lb.	.12½	.13	.12½	.13	.12½	.13½
Whale:						
Winter bleach, bbls, NY lb.	.091	.093	.091	.093	.072	.087
Refined, net, bbls, NY ... lb.	.087	.089	.087	.089	.068	.083

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Index to Advertisers

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"We"—Editorially Speaking

The ten universities which have the greatest number of graduates among those whose biographies are published in the forthcoming "Chemical Who's Who" are Columbia, 349; Massachusetts Institute of Technology, 330; Yale, 250; Illinois, 249; Cornell, 247; Harvard, 233; Wisconsin, 219; Johns Hopkins, 215; Chicago, 212. Foreign universities have 640 graduates represented, and 548 received only a public school education.

Hobbies reveal catholic tastes and a wide diversity of interest. Golf with 1044 claims the greatest number of devotees, followed by fishing (659), gardening (465), photography (360), tennis (322), books and reading (316), stamps (293), hunting (255), music (176), travel (150). Grouped into larger classes the hobbies of our chemical leaders fall in the following: Sports and Games, 3415; Arts and Letters, 1055; Out-of-doors (gardening, natural sciences, etc.), 809; Collectors (stamps, books, minerals, etc.), 538; Handicrafts (woodworking, models, clocks, etc.), 146; Scientific (not in line with their regular work), 117, and Miscellaneous, ranging from taxi-driving and flirtation to Boy Scouts and genealogy, 205.

Both colleges and hobbies will be found completely summarized in the Appendix of the "Chemical Who's Who" which will be ready for distribution the end of this month. Here also will be found indices by the companies and institutions with which men are connected as well as of locations by city and state.

B. H. Little, author in this issue, is an enthusiast on pine oil, who has had several articles published on its properties and uses. When "Britt," as he is known to his associates, isn't planning new outlets for this product he reads *Collier's*, *Time*, and CHEMICAL INDUSTRIES (thanks for the advt.). One of his hobbies is analyzing football plays which he likens to the business of selling, the sales organization being a football team; the quarterback the control of the sales plan; the line play is made by the salesman; a cleverly conceived advertising program is the forward pass which reaches out at the right time and decides the outcome of the game; the touchdown is the actual sale. Fried chicken and corn on the cob are his favorite foods.

At Geneva, last month, at a conference on chemical hours and wages, eleven nations were represented. Germany and Italy were conspicuously absent, but the U. S. A. was there (although neither American chemical industry or labor sent delegates) and "our" representative Prof. Theodore Krets told all and sundry that the 40 hour week is already a fact in this country and that the switch from the 48 hour week involved only a two per cent. increase in chemical costs. He emphasized the international agreements among the chemical colossi and argued that what is good for the employers ought to be good for the workers in favor of a world-wide 40 hour week. We fuss about taxes, but plainly the government does not intend to raise the historic issue of taxation without representation. But what representation!

Fifteen Years Ago

From our issues of February, 1922

Changes in du Pont's Dyestuffs Department include: F. W. Pickard to General Manager; C. A. Meade and M. R. Poucher, executive staff officials; Cesare Protto, director.

Harshaw, Fuller & Goodwin, Cleveland, move their offices to new Hanna Bldg.

Charles H. MacDowell, addressing National Agricultural Conference, says: "Fertilizer makers lost $75,000,000 in 1921."

E. D. Winkworth elected president Solvay Process Co.

Macbeth-Evans Glass, Elwood, Ind., starts eight additional furnaces.

Bowker Insecticide announces a research chemical division to study methods for producing cheaper and more effective spray materials.

Title of editorial: "Why is the Patent Office?"

F. J. McDonough, McKesson & Robbins, sails to spend two months abroad.

Vanilla crop smallest in years.

Grasselli Chemical arranging to resume operations at Terre Haute plant, idle since Dec. 1920.

American Chemical Importers Ass'n formed with Dr. J. Jungmann, Jungmann & Co., as president.

David W. Jayne and Herbert G. Sidebottom sever connections with Barrett to enter business under name Jayne & Sidebottom, Inc., to act as chemical manufacturers agents.

Foreign chemical news this month is all very confusing what with the head of the Russian chemical trust executed as a spy and the head of the British chemical trust made a baron; with Hitler tightening up chemical exports and Mussolini trying to encourage chemical exports, it is all highly disconcerting.

Congress legislating for our economic ills reminds us of the old sea captain of the windjammer days whose scanty medical stores were labelled by number only. Lacking a number nine he blandly took four and five and administered the admixture to some poor devil. What happened to the sick sailor is not recorded, but we have a good idea; since we have all had to swallow enough of the alphabetical concoctions of the political medicine men who cheerfully legislate the "new economics" without knowing the first thing about the old.

Harold A. Levey, who tells about white shoe cleaners in this issue, is a chemical engineer, a bright, versatile conversationalist, and claims for one of his hobbies classical piano music. He was born in New Orleans in 1889 and has contributed to chemical literature at different times on the subject of cellulose plastics and lacquers, fields in which he has done much theoretical research and not a little practical manufacturing.

In one of its weekly bulletins a Washington news service comments on the change in the character of the president's advisers as follows:—"Somebody has phrased it this way—'Three years of undergraduate joy and then the sobering diploma (November elections).'" Are they subtly suggesting the possibility of indefinite graduate study?

One of our contemporaries, reviewing the annual report of the Federal Trade Commission headlines the story—"Wants More Power." And we have always believed that it was only stories of the "tail wags the dog" variety that were "news."